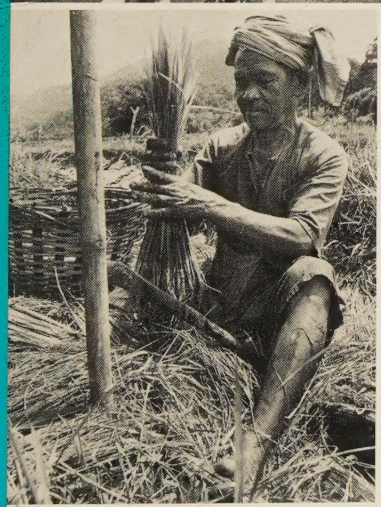
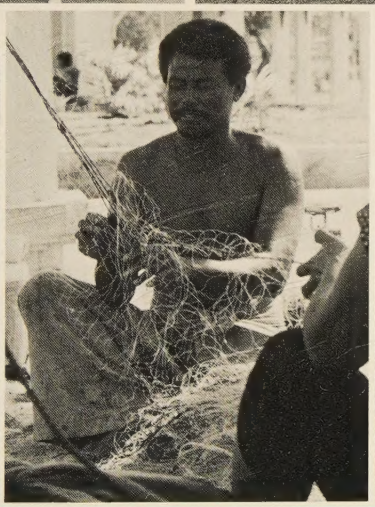
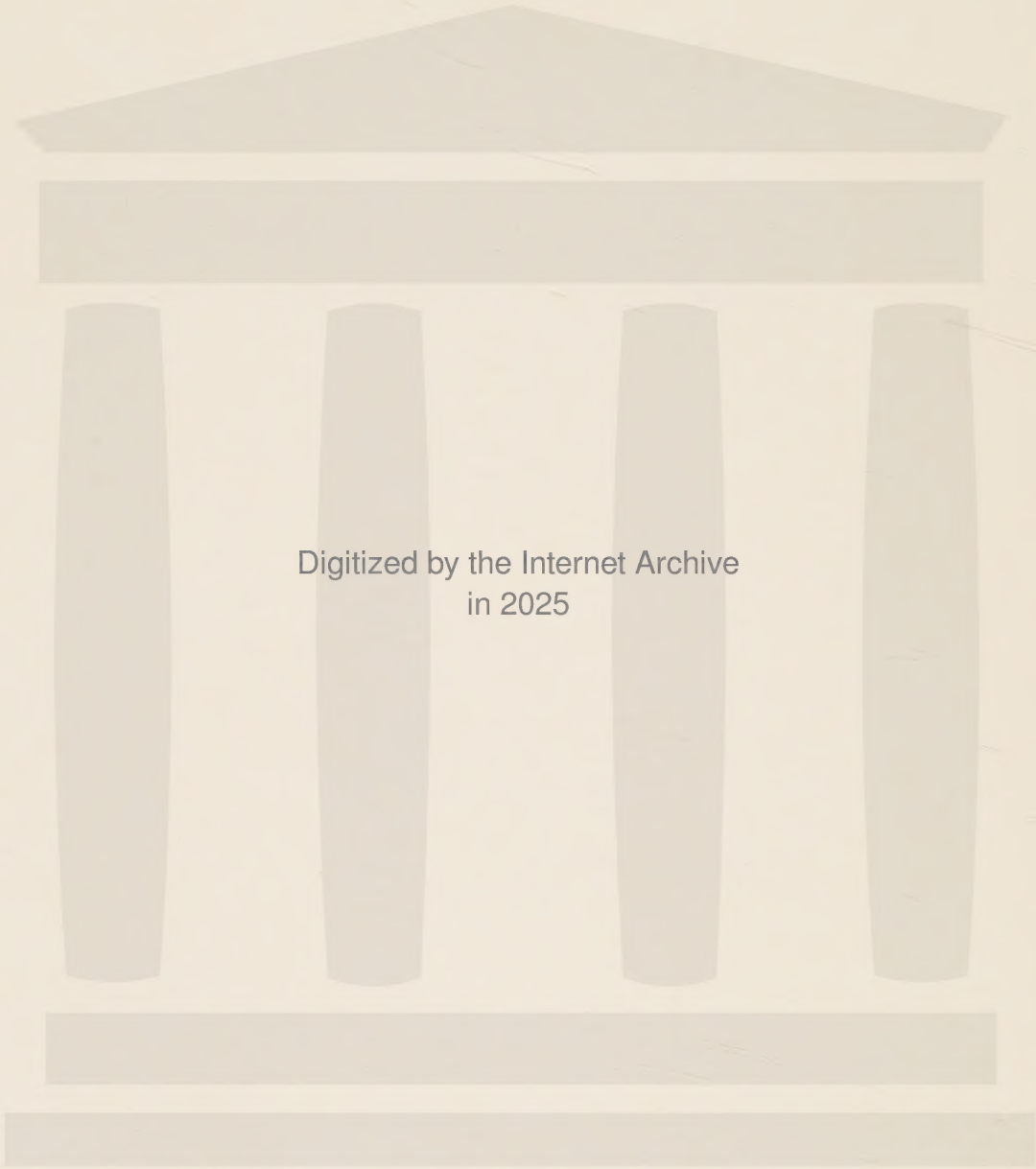
Occupational and geographical mobility in and out of Thai fisheries

LIBRARY
Apr/o 1986
National Marine Fisheries Service

FAO
FISHERIES
TECHNICAL
PAPER
271

FOOD
AND
AGRICULTURE
ORGANIZATION
OF THE
UNITED NATIONS



Digitized by the Internet Archive
in 2025

https://archive.org/details/fao-fisheries-and-aquaculture-technical-paper_1986_271

Occupational and geographical mobility in and out of Thai fisheries

by
Theodore Panayotou
Harvard Institute for International Development
Harvard University
Cambridge, MA 02138
USA
and
Donna Panayotou
Newton, MA 02165
USA

FAO
FISHERIES
TECHNICAL
PAPER
271

FOOD
AND
AGRICULTURE
ORGANIZATION
OF THE
UNITED NATIONS
Rome, 1986

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

M-43
ISBN 92-5-102347-6

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying or otherwise, without the prior permission of the copyright owner. Applications for such permission, with a statement of the purpose and extent of the reproduction, should be addressed to the Director, Publications Division, Food and Agriculture Organization of the United Nations, Via delle Terme di Caracalla, 00100 Rome, Italy.

© FAO 1986

PREPARATION OF THIS DOCUMENT

The conventional bio-economic models on fisheries generally assume that mobility of labour into and out of a fishery occurs easily, although it has sometimes been recognized that exit from a fishery may be more difficult than entry. This assumption needs to be examined, particularly in the case of small-scale fisheries in developing countries where the presence or lack of employment opportunities is critically important for fisheries management. This paper provides the first attempt to study fisheries labour mobility in a developing country and is part of FAO's Regular Programme of activities devoted to assisting fisheries administrators and others responsible for fisheries management. It is part of FAO's series of papers relating to the PRACTICES OF FISHERIES MANAGEMENT.

At the time of preparation of this study, Dr. Theodore Panayotou was with the Agricultural Development Council and attached to the Faculty of Economics and Business Administration, Kasetsart University, Bangkok, Thailand, and Mrs. Donna Panayotou was a graduate student in Thammaset University, Bangkok. Theodore Panayotou is presently with the Harvard Institute for International Development (HIID) at Harvard University, 1737 Cambridge Street, Cambridge, MA 02138, USA. Donna Panayotou, economic consultant, 26 Brooks Avenue, Newton, MA 02165, USA.

ACKNOWLEDGEMENTS

The authors wish to acknowledge with thanks logistic support from the Department of Fisheries of the Royal Thai Government, financial support from FAO, research assistance from Songpol Jetanavanich, and helpful comments from Francis T. Christy, Jr.

Distribution:

FAO Fisheries Department
FAO Regional Fisheries Officers
Directors of Fisheries
Fisheries Management Selector
Authors

For bibliographic purposes this document should be cited as follows:

Panayotou, T. and D. Panayotou, 1986 Occupational and geographical mobility in and out of Thai fisheries. FAO Fish. Tech.Pap., (271):77 p.

ABSTRACT

This study was carried out against the background of two opposing tenets: the open-access theory which assumes perfect factor mobility in and out of fishing, and small-scale fishery studies which maintain that fishermen are occupationally and geographically immobile.

Using the results of two surveys taken five years apart in a number of Thai fishing villages and employing different methods of analysis, the present study estimates the degree of mobility among fishing households and identifies and measures the relative significance of impediments to mobility. It is found that fishermen are responsive to economic incentives and do move between occupations to take advantage of earning differentials. This mobility, however, is tempered by non-economic factors such as age, location-religion, isolation and occupational preference. Labour appears to be quite mobile between occupations but less so between locations.

Fishermen do not admit having emotional attachment to fishing but they do admit certain attachment to their area of residence and a distrust for unknown far-away places. Given a choice, they prefer other rural areas over the big city, and crop or fish farming over factory employment. Both religion and distance appear to constrain geographical mobility with Muslims being more mobile than Buddhists.

Mobility in and out of fishing, though considerable, is lower than mobility in and out of non-fishing occupations. Mobility of labour out of fishing is, if anything, greater than mobility into fishing, but the case with capital may be different. Out-migration is temporary and usually in response to economic incentives, especially in fishing activities elsewhere; in-migration,on the other hand, is more permanent but less significant and it is socially rather than economically induced.

Thus, both the extreme positions of perfect mobility assumed by the open-access theory and of total immobility advanced by small-scale fisheries studies, are rejected in favour of imperfect but substantial mobility constrained by location, occupation and household specific factors. In the light of this finding, government efforts to upgrade small-scale fisheries will be met with considerable response from fishermen provided the right incentives are given. However, the only way that allocation of additional resources to small-scale fishermen could benefit them in the long run is if fishing effort could be controlled to prevent gradual dissipation of resource rents and if alternative employment opportunities are developed to raise fishermen's opportunity costs.

This study further indicates that for such a policy to be successful the new opportunities should not only be at least as profitable as fishing but they should be located in the vicinity of the fishing communities (especially for Muslim fishermen) and should have some of the features of fishing that the fishermen considered essential to their way of life and working style. In the long-run, broader occupational and geographical mobility should be encouraged especially from areas with a poor resource base.

TABLE OF CONTENTS

	Page
1. INTRODUCTION	1
1.1 Objectives of the study	2
1.2 Significance of the study	2
1.3 Scope and plan of study	2
2. ANALYTICAL FRAMEWORK : MOBILITY DEFINED	2
3. DATA REQUIREMENTS AND SOURCES	4
4. OCCUPATIONAL MOBILITY	6
4.1 Occupational background	6
4.2 Perception of employment alternatives and occupational attitudes	9
4.3 Recent occupational changes	17
4.4 Labour supply	27
5. GEOGRAPHICAL MOBILITY	39
5.1 Residential background and travel	40
5.2 Willingness to change residence	40
5.3 Migration into and out of fishing communities	44
6. SUMMARY AND POLICY IMPLICATIONS	52
7. BIBLIOGRAPHY	54
APPENDIX A : A MODEL OF LABOUR SUPPLY AND ALLOCATION	55
APPENDIX B : QUESTIONNAIRE - LABOUR MOBILITY IN THE THAI FISHERIES	62

LIST OF FIGURES AND TABLES

Page

Figures

1. Backward bending labour supply curve 56
2. Labour supply allocation between fishing and non-fishing activities 58

Tables

1. Occupational experience of fishing household heads in four coastal provinces, Thailand 1978 7
2. Frequency distribution of household heads and members by occupation, in four coastal provinces, Thailand 1978 9
3. Frequency distribution of non-fishing jobs by type of activity (household heads), in four coastal provinces, Thailand 1978 10
4. Frequency distribution of non-fishing jobs by type of activity (household members), in four coastal provinces, Thailand 1978 11
5. Perception of employment opportunities and occupational mobility (willingness to change) among fishing household heads in four coastal provinces, Thailand 1978 12
6. Fishermen's perception of the outlook and prospects of fishing occupations in selected fishing villages in Chumporn and Pang Nga Provinces of Thailand 1983 14
7. Fishermen's perception of alternatives to fishing; willingness and plans for change, Chumporn and Pang Nga Provinces, Thailand 1983 15
8. Fishermen's perception of problems with fishing as an occupation in Chumporn and Pang Nga Provinces, Thailand 1983 18
9. Fishermen's perception of problems with non-fishing occupations in Chumporn and Pang Nga Provinces, Thailand 1983 18
10. Fishermen's suggestions to improve their economic and social conditions in Chumporn and Pang Nga Provinces, Thailand 1983 19
11. Exit from and entry into different fishing occupations measured in man-days, persons and households between 1978 and 1983, selected villages in Muang District, Chumporn Province, Thailand 20
12. Exit from and entry into different non-fishing occupations measured in man-days, persons and households, between 1978 and 1983, selected villages in Muang District, Chumporn Province, Thailand 21
13. Exit from and entry into different fishing occupations measured in man-days, persons and households, between 1978 and 1983, selected villages in Muang District, Pang Nga Province, Thailand 23
14. Exit from and entry into different non-fishing occupations measured in man-days, persons and households, between 1978 and 1983, selected villages in Muang District, Pang Nga Province, Thailand 24
15. Average age, education, sex and marital status of persons who (a) entered fishing, (b) left fishing and (c) continued fishing during the past five years (1978-83) in selected villages of Chumporn Province, Thailand 25

		Page
16.	Average age, education, sex and marital status of persons who (a) entered fishing, (b) left fishing and (c) continued fishing during the past five years (1978-83) in selected villages of Pang Nga Province, Thailand	26
17.	Changes in fishing incomes, employment, wages and assets between 1978 and 1983 in selected villages in the Muang District, Chumporn Province, Thailand (average per household)	29
18.	Changes in non-fishing incomes, employment, wages and assets between 1978 and 1983 in selected villages in the Muang District, Chumporn Province, Thailand (average per household)	30
19.	Changes in fishing incomes, employment, wages and assets between 1978 and 1983 in selected villages in the Muang District, Pang Nga Province, Thailand (average per household)	31
20.	Changes in non-fishing incomes, employment, wages and assets between 1978 and 1983 in selected villages in the Muang District, Pang Nga Province, Thailand (average per household)	32
21.	Changes in total incomes, employment, wages and assets between 1978 and 1983 in selected fishing villages in Chumporn Province, Thailand (average per household)	33
22.	Changes in total incomes, employment, wages and assets between 1978 and 1983 in selected fishing villages in Pang Nga Province, Thailand (average per household)	34
23.	Changes in family size, working members, women's labour participation, education of working members and age of fishing household in selected villages in Muang District of Chumporn Province, Thailand	35
24.	Changes in family size, working members, women's labour participation, education of working members and age of fishing household in selected villages in Muang District of Pang Nga Province, Thailand	36
25.	Changes in the price index of the consumption basket between 1978 and 1983 in selected fishing villages, Thailand	37
26.	Preliminary estimates of mobility coefficients for fishing and non-fishing occupations in Chumporn and Pang Nga Provinces of Thailand	38
27.	Geographical mobility of fishing household heads in four coastal provinces, Thailand 1978	41
28.	Geographical mobility (travel) during 1983 by village and place of visit	42
29.	Willingness to change residence, given appropriate occupation, among fishing household heads in four coastal provinces, Thailand 1978	
30.	Mobility-related characteristics of selected fishing villages in Chumporn and Pang Nga Provinces of Thailand, 1983	45
31.	In-migration between 1978 and 1983, selected fishing villages in Chumporn and Pang Nga, Thailand	46
32.	Out-migration between 1978 and 1983, selected fishing villages in Chumporn, Thailand	47

		Page
33.	Out-migration between 1978 and 1983, selected fishing villages in Pang Nga, Thailand	48
34.	Destination, occupation and income of out-migrants in selected villages in Chumporn Province in Thailand recorded in 1983	49
35.	Destination, occupation and income of out-migrants in selected villages in Pang Nga Province, Thailand, recorded in 1983	50
36.	Origin, occupation and income of in-migrants in selected villages in Chumporn Province, Thailand, recorded in 1983	51
37.	Origin, occupation and income of in-migrants in selected villages in Pang Nga Province, Thailand, recorded in 1983	51

1. INTRODUCTION

The fisheries is a natural resource which, like land, forests and other natural resources in limited supply, is capable of yielding a rent, that is, a return over and above the opportunity cost of inputs necessary for its exploitation. However, unlike land which is privately owned, the fishery resource is open access or common property and, therefore, any rents which are generated constitute non-appropriated income.

According to the open-access theory, these rents attract new entrants who compete for a share of these profits with existing fishermen who also increase their fishing effort in an attempt to maintain their share of the rents. This competition leads to excessive effort and eventual dissipation of rents. Only when rents are completely dissipated would the entry (increase in effort) into the fishery cease. The reverse process takes place when rents are negative. That is, when the returns from fishing do not cover the opportunity cost of the inputs employed (other than the fishing ground), fishermen, incurring losses, leave the fishery for other occupations where they earn their opportunity cost. Exit continues until losses (or negative rents) are eliminated. In equilibrium, fishermen earn no more and no less than their opportunity costs, i.e., what they can earn in their next best alternative occupation.

Implicit in the theory of resource allocation under open access is the assumption of perfect mobility of factors of production. Labour and capital move in and out of the fishery in response to income differentials so as to equalize the return from fishing to the return from other comparable activities. The prediction of the theory that under open access all rents would be dissipated rests squarely on the assumption of perfect factor mobility. With limited factor mobility into (out of) the fishery, rents (losses) would persist despite the open-access status of the fishery.

There is some evidence that income differentials (both negative and positive) do exist between fishing and other occupations in Thailand and elsewhere. For instance, in the province of Chumporn in Thailand, fishing labour in 1978 earned on the average a wage rate of 59 baht per man-day compared to 67 baht per man-day earned by the unskilled labour in the same province and 75 baht per man-day earned by the household labour engaged in home fish processing. Even more striking was the situation in the province of Pang Nga where unskilled labour in non-fishing occupations (mainly off-shore mining) earned 268 baht per man-day compared to 97 baht earned from fishing (including own fishing, fishing labour and fish processing) and 99 baht from other non-fishing occupations. In contrast, in the province of Trat, fishing labour earned 113 baht per man-day compared to only 48 baht earned by hired non-fishing labour. Fishing occupations in Trat were on the average three times as profitable as non-fishing occupations. (For these and other figures on income differentials see Panayotou, et al., 1982.)

The existence of wage rate differentials among comparable occupations and locations raises questions about the degree of mobility in and out of the fishery and other occupations unless one is prepared either to attribute all wage differentials to retraining and relocation costs and/or to a temporary disequilibrium (i.e., incomplete adjustment to recent shocks) or to do away with the postulate of profit maximization as the objective of economic activity altogether. The present study is an attempt to obtain a measure of the degree of mobility in and out of fishing by identifying situations where retraining and relocation costs are not significant (or can be accurately measured and taken into account) and where wage differentials exist for some time to allow for adjustment. We get around the issue of the validity of profit maximization as the objective of fishing and other economic activity by allowing the household's consumption-leisure choice to determine the household's overall labour supply. This still assumes that fishing households are economically "rational" but allows them to choose additional leisure over additional income if they so desire.

Within this framework a fishing household is expected to adjust the allocation of its total labour supply to take advantage of wage differentials or, at least,of changes in these differentials (if their absolute magnitude represents differential disutility between occupations). The more responsive the household's labour supply to changes in (net) wage

differentials between occupations and locations the more mobile the household is said to be. Small adjustment of labour supply to large changes in wage differentials imply immobility. Immobility may be attributable to the socio-cultural characteristics of the household or to the environment in which it exists and operates. It is within the scope of this study to attempt to identify these impediments to mobility and obtain a measure of their relative importance.

1.1 Objectives of the study

More specifically, the objectives of this study are: (1) to estimate the income differential (or "rent") between fishing and non-fishing occupations by calculating fishermen's net income and comparing it to their opportunity cost; (2) where possible to adjust these differentials for the real cost of change of occupation or residence in order to arrive at the true income differentials; (3) to measure mobility in and out of the fishery in response to these differentials; and (4) to determine the constraints to mobility, i.e., to identify the non-economic factors which account for imperfect mobility and persistence of income differential. The general hypothesis of this study is that there is factor mobility in response to income differentials but that it is limited by non-economic factors such as household age and sex structure, family size, education, religion, isolation, etc.

1.2 Significance of the study

The results of the study are expected to have both analytical significance and implications for policy. Factor immobility into the fishery, if established empirically, would mean a level of fishing effort below the level predicted by the theory, while immobility out of the fishery would mean a larger level of effort than conventional theory would predict. The policy implications would vary depending on the direction and degree of factor immobility. Limited mobility into a thriving fishery may call for a mechanism for creaming off part of the rents for the benefit of the society at large. Immobility out of a declining fishery may call for short-term welfare assistance and addditional long-term incentives beyond compensation for retraining and relocation costs. Creating alternatives to fishing may not be sufficient if mobility is limited by factors such as caste restrictions, religious taboos, or attachments to a particular location or way of life. Not only should alternatives be sufficiently attractive relative to fishing but social changes conducive to mobility need to be induced.

1.3 Scope and plan of study

While factor mobility includes the mobility of labour, capital and natural resources, the present study will focus on labour mobility. The other factors of production will be subsumed into the non-labour income.

We will further limit the scope of the study by focussing our attention on small-scale fisheries where limited mobility due to non-economic factors is more likely to be a problem. Geographically, we will concentrate on two coastal provinces of Thailand, Chumporn and Pang Nga, for which baseline data are available, rather than attempt to draw a representative sample of the Thai small-scale fisheries.

Finally, we are more concerned about changes in labour supply in response to changes in economic incentives than we are about changes in "wholesale" migration of the household. Therefore, our focus is on the place of origin (the fishing community) rather than the place of destination.

2. ANALYTICAL FRAMEWORK : MOBILITY DEFINED

Mobility may be defined as the shiftability between jobs, occupations or locations in response to incentives. If the owners of the factors of production (labour, capital and land) were only concerned with maximizing their earnings, they would move these factors to those activities which would earn them the highest incomes. In a frictionless/timeless system, the factors of production would move between uses in response to even small earning differentials. However, the system is neither frictionless nor timeless;

it takes time to acquire new skills or to transform one form of capital into another; and, relocation is a costly and time-consuming process. Thus, mobility does not take place except in response to net (rather than gross) income differentials, i.e., change in income less training and relocation cost. Where differences in risk are involved, a higher return is expected to accrue as compensation for the higher risk.[1/]

Mobility differs between factors of production. Land, unlike capital and labour, is locationally immobile; it can only be shifted between uses. More importantly, the supply of labour, unlike that of capital and land, requires the physical presence of the owner of the factor; there are absentee landlords (who receive income from land) but no absentee labourers. For this reason non-economic considerations are much more important in the allocation and mobility of labour than in the allocation and mobility of other factors of production. Climate, socio-cultural environment, type and place of work, social status of occupation, etc. influence the decision of people as to where they work and what work they do. They may be willing to accept a lower monetary remuneration because of the greater non-monetary rewards that a given job can afford over higher-paying jobs. As a corollary, people will not move every time they can earn a higher wage elsewhere.

Immobility of one factor may cause immobility of other factors with which it is combined in production. For example, inability to liquidate fixed assets without undue loss limits the mobility of the labour services of the owner of these assets. Preference for a particular location for residence may limit the options available for employment of capital. Insecurely held land may inhibit mobility of labour for fear that physical absence may result in loss of ownership.

The degree of mobility differs between industries, regions, countries and over time. There are man-made encouragements as well as impediments to mobility. Mobility may be enhanced through education, training, improved transportation and communications and through the establishment of employment agencies. Mobility may be restricted through unions, licensing, territorial or seniority rights, descrimination, racial prejudice, caste, indebtedness, etc. Following a change in incentives, mobility increases as the time allowed for adjustment increases; that is, mobility is expected to be relatively low in the short-run and higher over the long-run.

Mobility may be only partial in the sense that only part of a factor is shifted to alternative uses in response to incentives as, for example, in the case of a rice farmer who shifts only part of his land to the production of cash crops which are generally more profitable than rice. Another example is the case of a fisherman who continues to be a part-time fisherman in the face of more lucrative alternatives. One form of partial mobility is the temporary or seasonal change of occupation or location as may happen during a bad fishing year or during the monsoon season.

Mobility may be limited not only in time but also in scope and space. Fishermen may be quite mobile within the fishery, shifting between fishing gears and fishing grounds,but quite immobile between the fishery and other sectors of the economy. Crewmen may be mobile between fishing jobs but unwilling to take up non-fishing jobs where they are paid a fixed wage instead of a share of the proceeds. People are likely to be more mobile within the vicinity of their community, province or region than over more extensive and less known geographical areas. Immobility, on the other hand, may be of a very restrictive form as in the case of a fisherman who cannot change his/her market outlet and source of inputs due to indebtedness and pre-emptive marketing arrangements with middlemen or simply due to lack of competition (barriers to entry) in fish marketing.

There may be some assymmetry between entry into and exit from a given occupation if entry has occurred at a relatively young age: or at a time when little skill or capital was required while exit is to take place at an advanced age when substantial skills have been acquired, occupation-specific capital accumulated and social bonds formed. This is

---

1/ At near subsistence levels of income, risk aversion is so high that even much better paying alternatives with somewhat higher risk may not be acceptable.

particularly true of the fishery where entry takes place when the fishery is "under-exploited" or during "good years" while exit becomes necessary after competition has induced considerable accumulation of skills and capital which have little use outside the now crowded and overexploited fishery. The reverse is also possible where there are barriers to entry in the form of closed communities or other forms of territorial use rights.

Mobility can be horizontal, as between similar jobs and occupations, or vertical such as the upward mobility of fishermen from crewmen to boat-owners, or from partners to sole owners, or from owners/operators to non-sea-going boat owners. Upward mobility may take place across occupations as in the case of a crewman who accumulates sufficient savings to buy land or other assets and become an independent farmer or a shopowner. Downward "mobility" is also possible as in the case of a boat owner who loses his fishing assets either at sea or because of insufficient provision for replacement and he is forced to become a crewman. Some small-scale fishermen unable to compete with trawlers have often sought employment as crewmen on these same trawlers. Vertical mobility may be between social classes rather than occupations though the two are often related.

For the purpose of this study, mobility is more narrowly defined as the tendency to change occupation or location of work and residence in response to economic incentives. By implication, immobility is the tendency to retain one's occupation and place of residence despite the economic advantages offered elsewhere. Alternatively, mobility (immobility) may be defined as the responsiveness (unresponsiveness) to income differentials between occupations and locations.

While this mobility concept applies to any factor of production (capital, labour and even land), here we will focus on labour mobility because (a) labour is thought to be less mobile than other factors for socio-cultural reasons, and (b) the immobility of labour limits the mobility of other factors of production which labour owns and manages or with which labour is combined in production. This is not to ignore the fact that the immobility of other factors, such as sunk capital and untitled land, may also constrain labour mobility.

In Appendix A we develop a more formal model of labour supply and allocation between different occupations based on consumption-leisure choice and income maximization subject to a labour transformation constraint. The labour supply to a particular occupation, say fishing, is derived as a function of the total wage rate (opportunity cost of leisure)[1/], non-labour income and the wage differential between fishing and non-fishing occupations (see Appendix A for further details).

3. DATA REQUIREMENTS AND SOURCES

Ideally, one would like to have a lengthy time series recording changes in occupation and residence of a representative sample of fishing and non-fishing households and corresponding changes in the explanatory variables (wages, prices, assets, socio-demographic structure of households and social and physical infrastructure of the community). Unfortunately, such data are not currently available in Thailand (and many other developing countries) nor are they likely to become available in the near future. At the other extreme, one may use recall-type surveys to reconstruct the past and attitudinal surveys to predict the future. Here, we have adopted an intermediate approach, the best possible in the absence of time series data: we utilize information from two surveys of the same sample, conducted five years apart.

The first survey, used here as a baseline, was conducted in 1978 by Kasetsart University staff members including the senior author for a Kasetsart/IDRC study on the "Socioeconomic conditions of Coastal Fishermen"[2/]. Four coastal provinces, namely

---

1/ The term "leisure" in this study is used in its strict economic sense of voluntary non-work without the connotations of luxury implicit in its everyday use.

2/ See studies on Thai Fisheries in Panayotou, T. (ed.), Socioeconomic Analysis and Policy, IDRC, Ottawa, 1985

Chumporn, Nakhon Sri Thammarat, Trat and Pang Nga, were then selected as a cross-section representation of coastal fisheries in Thailand. Geographically, the four project sites were so selected that two, Chumporn and Nakhon, are located on the west coast of the Gulf, one, Trat, on the east coast of the Gulf and, one, Pang Nga, on the Andaman Sea. Religion was also a factor in selecting the four provinces: Chumporn and Trat consist of purely Buddhist communities, Pang Nga is predominantly Muslim, and Nakhon is mixed. A third criterion in the selection of sites was the level of fisheries development: Nakhon and Pang Nga are small-scale fisheries while Chumporn and Trat are small- to medium-scale by comparison with Thailand's industrial fisheries.

The selection of provinces was followed by the choice of districts (Amphoe) within each province. The coastal district with the larger fishing population was chosen on the basis of a priori information provided by the Department of Fisheries. In all four provinces, this led to the selection of the central district (Amphoe Muang) where the provincial capital is located.1/ On the basis of information provided by provincial fishery officials, the clusters of villages (Tambol) where more than 50 percent of the households are engaged in fishing were identified. From each selected Tambol, only villages with predominantly fishing populations, over 80 percent of the households, were included. Once the villages were selected, a random sample of about 30 percent of the fishing households from each village was drawn. The total sample size for all four provinces was 891 households.2/ Data were collected on variables such as catch and effort, cost and prices, fishing and non-fishing employment and assets, incomes and expenditures, and a host of socio-demongraphic variables including information on occupational and geographical mobility (the latter is reported and analyzed for the first time in the present study).

Five years later (1983) we drew and interviewed a sub-sample of 151 households out of the 1978 sample for the purpose of this study. In drawing this sample we limited ourselves to only two provinces: predominantly Buddhist Chumporn on the west coast of the Gulf of Thailand and predominantly Muslim Pang Nga on the Andaman Sea coast. We used basically the same questionnaire and some of the same interviewers and collected information on some of the same variables with added emphasis on occupational and geographical mobility. A copy of the questionnaire is attached as Appendix C to this study. (Note that only a subset of this questionnaire was actually utilized for the 1983 survey.)

Before analysing the occupational and geographical mobility among fishermen, it might be helpful to describe briefly the characteristics of the fisheries we are concerned with. We do this based on the 1978 survey which has gathered such background information. The fisheries studied in all four locations are small- to medium-scale. We define scale in terms of the 1978 value of assets. Gear-groups with fishing assets under 20 000 baht are classified as "small-scale" while those with over 20 000 baht but under 100 000 baht are classified as "medium-scale". Based on this definition, the surveyed fishing units in Chumporn and Trat were divided about equally between the two groups, while in Pang Nga and Nakhon Sri Thammarat virtually all fishing units (households) were classified as small-scale.

In Chumporn the most important types of fishing gear are cast-nets (small-scale), fish gill-nets,trawl-nets and push-nets (medium-scale). In Nakhon trawl-nets, shrimp gill-nets, lift-nets (small-scale) and push-nets (medium-scale) are the predominant gears. In Pang Nga a variety of gears are used both individually and in combination, including several non-powered types. Shrimp and crab gill-nets are particularly popular. A few push-nets were in operation but no trawlers, since the coastal fishing grounds of Pang Nga are not trawlable. Finally in Trat crab gill-nets and crab traps dominate the small-scale fishery while shell-rakes, push-nets and trawl-nets make up the medium-scale fishery.

1/ The choice of the central districts by virtue of their size and central location biases the sample against scattered and isolated fishing communities which are often the poorest of the poor.

2/ The description of the 1978 survey is drawn from Panayotou, et.al., (1982)

Fishing time ranges from 5.7 months per year for shrimp gill-nets in Chumporn to 11.5 months for crab traps in Trat. The length of boat also varies considerably, from 5.8 m for combined small-scale gear in Chumporn to 12.9 m for combined trawl-nets and shrimp gill-nets in Nakhon. However, the most variable characteristic of the fishery is the horsepower of the engine which ranges from zero hp for non-powered boats in Pang Nga to 4.6 hp for miscellaneous small-scale gear in Chumporn to 95 hp for shell-rakes in Trat and 79-85 hp for trawl-nets, push-nets and purse seines in Chumporn (all medium-scale gear).

In all locations and for most types of gears the main catch in terms of value was shrimp of one variety or another, with the exception of Chumporn where the main catch was the Indo-Pacific mackerel followed by shrimp and squid. Crab was particularly important in Pang Nga and Trat. Trashfish was important among Chumporn's medium-scale gear and shell-fish among Trat's shell-rakes and trawl-nets. On the average, small-scale gears caught smaller quantities of fish but received higher unit price than medium-scale gears, but in terms of gross value of catch the former lagged behind the latter.

4. OCCUPATIONAL MOBILITY

Our discussion of occupational mobility is organized into four sections. In the first section we review the occupational background of fishing households drawing mainly on the 1978 survey. In section 2 we report and comment on fishermen's occupational attitudes and outlook, drawing equally on the 1978 and 1983 surveys. In section 3 we discuss recent occupational changes (entry into and exit from fishing and non-fishing occupations) and the socio-demographic characteristics of the people involved. Finally, in section 4, we analyse changes in labour supply to fishing and non-fishing occupations in response to economic factors and suggest non-economic factors that may help explain relative occupational immobility. The last two sections are based on the changes that occurred between the two surveys (1978 and 1983). A word of caution is in order: only in these last two sections are the results of the two surveys strictly comparable as they refer to exactly the same sample. In earlier sections only rough comparisons can be made as the 1983 figures are based only on a small-scale fisheries subsample drawn from the more extensive 1978 survey.

4.1 Occupational background

The frequency distribution of fishing household heads according to fishing and non-fishing experience (Table 1) suggests that fishing has declined in popularity in recent years. Only 39 percent of 755 sampled household heads have entered fishing as a main occupation during the ten years preceeding the 1978 survey compared to 52 percent who entered non-fishing occupations as supplementary or main sources of income during the same time period. That this trend is related at least partly to economic factors is evident from the differences in these percentages between the provinces of Pang Nga and Trat. During the 1970s, Pang Nga had experienced a boom in non-fishing occupations such as off-shore mining, mangrove felling and tourism which attracted fishermen out of fishing into these occupations although, as shown also in Table 1, less than 10 percent of Pang Nga fishermen had any background in non-fishing occupations. Only 25 percent of sampled fishing household heads had joined fishing in the 10 years prior to the 1978 survey compared to 69 percent who entered non-fishing occupations. A rather striking example of occupational mobility in Pang Nga has been the conversion of some 5 000 fishing boats into mining suction boats for (illegal) off-shore mining (see Far Eastern Economic Review, October 6, 1976 and Investor, March 1979).

In contrast, Trat has experienced a fishing boom because of its proximity to Kampuchean waters which have remained underfished throughout the Indo-Chinese wars (including the recent Kampuchea conflict). As a result, 46 percent of sampled Trat household heads entered fishing during 1969-1978 compared to only 33 percent who entered non-fishing occupations, although only 42 percent had any background in fishing (see Table 1).

Table 1 also shows that on the average 63 percent of all household heads had occupational background in fishing, 20 percent in (unskilled) hired labour and 10 percent in (subsistence) rice farming. This tends to support the often expressed view that the small

Table 1

Occupational experience of fishing household heads in four coastal provinces, Thailand 1978

	Chumporn		Nakhon[a/]		Trat		Pang Nga		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
A. Years of experience in main fishing occupation										
< 5.1	42	20.9	52	22.1	22	17.3	14	7.3	130	17.2
5.1 - 10	47	23.4	50	21.3	36	28.4	33	17.2	166	22.0
10.1 - 15	21	10.5	39	16.6	16	12.6	21	10.9	97	12.9
15.1 - 20	39	19.4	36	15.4	23	18.1	39	20.3	137	18.2
20.1 - 25	14	6.9	13	5.5	7	5.5	11	5.7	45	6.0
25.1 - 30	23	11.4	24	10.2	10	7.9	33	17.2	90	11.9
> 30	15	7.5	21	8.9	13	10.2	41	21.4	90	11.8
TOTAL	201	100.0	235	100.0	127	100.0	192	100.0	755	100.0
B. Years of experience in minor fishing occupation										
< 5.1	1	14.3	9	33.4	1	25.0	1	12.5	12	26.3
5.1 - 10	4	57.1	7	25.9	2	50.0	2	25.0	15	32.6
10.1 - 15	-	-	5	18.5	-	-	-	-	5	10.9
15.1 - 20	2	28.6	1	3.7	1	25.0	2	25.0	6	13.3
20.1 - 25	-	-	2	7.4	-	-	-	-	2	4.3
25.1 - 30	-	-	1	3.7	-	-	2	25.0	3	6.5
> 30	-	-	2	7.4	-	-	1	12.5	3	6.5
TOTAL	7	100.0	27	100.0	4	100.0	8	100.0	46	100.0
C. Years of experience in non-fishing occupation										
< 5.1	14	17.5	19	38.0	7	17.5	12	30.7	52	24.8
5.1 - 10	27	33.7	8	16.0	6	15.0	15	38.4	56	26.7
10.1 - 15	7	8.8	4	8.0	2	5.0	5	12.8	18	8.6
15.1 - 20	12	15.0	8	16.0	3	7.5	2	5.1	25	11.9
20.1 - 25	9	11.2	2	4.0	-	-	-	-	11	5.3
25.1 - 30	5	3.7	1	2.0	2	5.0	3	7.6	11	5.3
> 30	6	7.5	8	16.0	20	50.0	2	5.1	36	17.2
TOTAL	80	100.0	50	100.0	40	100.0	39	100.0	209	100.0
D. Previous main occupation										
- Fishing	84	53.4	110	53.9	40	41.6	184	90.1	418	63.2
- Rice farming	18	11.4	31	15.1	9	9.3	5	2.4	63	9.5
- Upland crop farming	1	0.6	1	0.4	1	1.0	-	-	3	0.4
- Plantation farming	9	5.7	7	3.4	7	7.2	4	1.9	27	4.0
- Hired labour	38	24.2	51	24.9	35	36.4	5	2.4	129	19.5
- Government officer	3	1.9	-	-	1	1.0	-	-	4	0.6
- Retail trading	3	1.9	4	1.9	2	2.0	3	1.4	12	1.8
- Livestock farming	-	-	-	-	1	1.0	-	-	1	0.1
- Fish processing	-	-	-	-	-	-	-	-	-	-
- Small mining	1	0.6	-	-	-	-	3	1.4	4	0.6
TOTAL	157	100.0	204	100.0	96	100.0	204	100.0	661	100.0

a/ Nakhon Sri Thammarat

scale fishery is a last-resort occupation for the lowest income groups[1/].

The occupational structure of fishing households in the four provinces surveyed in 1978 is shown in Tables 2, 3 and 4. Only 58 percent of household heads and 40 percent of other household members were exclusively fishing operators, and another seven percent of each group were exclusively fishing labourers (Table 2). The rest were engaged in a variety of fishing-related and non-fishing occupations. Twenty-two percent of heads and 34 percent of other members were engaged partly or fully in occupations totally unrelated to fishing, although all households had at least one member in fishing. As noted earlier, non-fishing occupations were most important in Pang Nga and least so in Trat, accounting for 34 and 19 percent of the total number of working household members (other than head), respectively.

Tables 3 and 4 depict the frequency distribution of household heads, and members, respectively, among a variety of non-fishing occupations. Plantation farming, mainly rubber and coconut, accounts for 30 percent of non-fishing occupations practised by household heads, and unskilled labour for 32 percent of non-fishing occupations practised by other household members. These two occupations plus other types of farming (mainly rice and fruit orchards) taken together accounted for over 70 percent of all non-fishing employment. The balance included mainly retail trade and resource extraction such as small-scale mining and mangrove cutting. Of course, the distribution of these activities varied across locations. Plantations were most important in Chumporn and unskilled labour in Pang Nga and Nakhon Sri Thammarat (henceforth Nakhon for brevity). Mining was important only in Pang Nga which is located on Thailand's tin belt. Mangrove cutting was of importance only in the isolated fishing communities of Nakhon which are located in brackish waters and face relative scarcity of alternative employment opportunities.

The contribution of non-fishing activities to total household employment (man-days[2/] worked) ranged from 11 percent in Trat to 35 percent in Pang Nga with the other two locations averaging 20 percent. The dispersion in the contribution of non-fishing incomes to total income[3/] was even wider ranging from five percent in Trat to 45 percent in Pang Nga.

In all locations, household members, other than the head of the household contributed substantially to the household's labour supply and income but more to the former than to the latter, implying that they were engaged in less remunerative activities than the head of the household. "Other members" contributed on the average more than half the household total labour supply but earned only about one-third of the total household income. Somewhat surprising is the finding that women contributed more to labour supply (62 percent) and income (46 percent) in Pang Nga which is a predominantly Muslim province than in the other three provinces which are predominantly Buddhist. Most striking was the case of Nakhon where "other members" supplied 47 percent of the household's working hours but earned only 17 percent of the household's income which was, incidentally, the lowest among all four provinces studied.

A number of conclusions may be drawn from the above discussion of the occupational background of fishing households: (1) there appears to be a trend towards reduced entry into fishing compared to non-fishing occupations; (2) the majority of fishing household heads had no other occupational background before they entered fishing but a non-negligible percentage were former unskilled labourers (20 percent) and subsistence rice farmers (10 percent), implying a degree of occupational mobility; (3) households are engaged, in addition to fishing, in a variety of non-fishing occupations such as farming, hired labour, retail trade and non-fishery resource extraction which contribute a varying but generally substantial portion of the households labour supply and income (on the average, over half and one-third, respectively, in 1978).

1/ Unskilled labourers and subsistence rice farmers are the lowest-income groups in Thailand

2/ Eight-hour working day.

3/ Income here means "net" income as reported by the household heads; that is, no allowances for depreciation and interest on borrowed capital are deducted.

Table 2

Frequency distribution of household heads and members by occupation, in four coastal provinces, Thailand, 1978

Occupations	CHUMPORN		NAKHON		TRAT		PANG NGA		TOTAL	
	No.of persons	%	No.of persons	%	No.of persons	%	No.of persons	%	No.of persons	%
A. Household heads	217	100.0	290	100.0	137	100.0	247	100.0	891	100.0
1. FO only	136	62.7	170	58.6	78	56.9	132	53.5	519	58.3
2. FO + FL	-	-	3	1.1	2	1.5	-	-	5	0.6
3. FO + FP	-	-	4	1.4	23	16.8	20	8.1	47	5.3
4. FO + NF	26	12.0	56	19.3	7	5.1	64	25.9	150	16.8
5. FO + FL + FP	-	-	-	-	1	0.7	-	-	1	0.1
6. FO + FL + NF	-	-	1	0.4	1	0.7	-	-	2	0.2
7. FO + FP + NF	-	-	-	-	2	1.5	17	6.9	19	2.1
8. FL only	26	12.0	32	11.0	6	4.4	-	-	64	7.2
9. FL + NF	1	0.5	5	1.7	-	-	-	-	6	0.7
10. NF only	8	3.6	7	2.4	4	2.9	7	2.8	26	2.9
11. RF only	20	9.2	12	4.1	13	9.5	7	2.8	52	5.8
B. Household members[a/]	342	100.0	292	100.0	225	100.0	462	100.0	1321	100.0
1. FO	129	37.6	140	47.9	82	36.4	162	39.4	533	40.4
2. FL	33	9.7	48	16.5	5	2.2	16	3.5	102	7.7
3. FP	20	5.2	23	7.9	90	40.0	104	22.5	237	17.9
4. NF	160	46.9	81	27.7	42	18.7	159	34.4	442	33.5
5. FP + NF[b/]	-	-	-	-	6	2.7	1	0.2	7	0.5

Notation: FO = fishing operators; FL = fishing labour; FP = fish processing; NF = non-fishing operators; RF = retired fishing operators or housewives, non-sea going but still managing fishing operations.

a/ Only main occupation was reported for household members (other than head).
b/ Both FP and NF were reported as main occupations as the household member devoted equal amounts of time to the two occupations.

Source: Panayotou, et al. (1982)

4.2 Perception of employment alternatives and occupational attitudes

A necessary, though not sufficient, condition for occupational mobility is perception of alternative employment opportunities, especially in the vicinity of one's residence. Following such perception a decision (explicit or implicit) is made whether to switch fully or partly to the new opportunity or simply ignore it. When the alternative employment opportunity is rejected, it is revealing to enquire into the reasons for such a decision. Occupational immobility exists only if economic reasons cannot explain the household's decision to forego the alternative employment opportunity.

As shown in Table 5, out of 826 households sampled in 1978 only 31 percent knew of any employment opportunities in the vicinity of their community. There was little variation among the four provinces with the exception of Trat (20 percent) where non-fishing employment opportunities are limited and unrewarding compared to fishing. Unskilled labour employment was the most widely known alternative employment reported by 70 percent of all fishermen who knew of alternative employment opportunities. A distant second was retail trade, with 12 percent, followed by mining (only in Pang Nga) with seven percent.

Table 3

Frequency distribution of non-fishing jobs[a/] by type of activity (household heads), in four coastal provinces, Thailand, 1978

Non-fishing occupations	CHUMPORN		NAKHON		TRAT		PANG NGA		TOTAL	
	No. of persons	%	No. of persons	%	No. of persons	%	No. of persons	%	No. of persons	%
A. Farming	28	66.67	30	43.48	12	70.59	59	56.19	129	55.37
1. Crop farming (cf. rice)	6	14.29	18	26.08	2	11.76	11	10.48	37	15.88
2. Fruit orchard	1	2.38	-	-	2	11.76	11	10.48	14	6.01
3. Plantation b/	21	50.00	4	5.80	8	47.07	37	35.23	70	30.04
4. Livestock	-	-	3	4.35	-	-	-	-	3	1.29
5. Fish farming	-	-	5	7.25	-	-	-	-	5	2.15
B. Resource extraction	1	2.38	13	18.84	-	-	8	7.62	22	9.44
1. Small-scale mining	-	-	2	2.90	-	-	4	3.81	6	2.58
2. Mangrove cutting	1	2.38	11	15.94	-	-	4	3.81	16	6.87
C. Small business	2	4.76	4	5.80	-	-	13	12.38	19	8.15
1. Boat operation/rental c/	2	4.76	1	1.45	-	-	7	6.67	10	4.29
2. Retail trade d/	-	-	3	4.35	-	-	6	5.71	9	3.86
D. Wage employment	11	26.19	22	31.88	5	29.41	23	21.90	61	26.18
1. Government office	1	2.38	1	1.45	-	-	1	0.95	3	1.20
2. Construction (cf. carpentry)	4	9.52	2	2.90	-	-	-	-	6	2.58
3. Unskilled labour	6	14.29	19 e/	27.53	5	29.41	22f/	20.95	52	22.32
E. Other	-	-	-	-	-	-	2	1.91	2	0.86
	42		69		17		105			

a/ Few of these jobs are full-time or permanent; the great majority of them are part-time, seasonal or temporary
b/ Mainly coconut and rubber
c/ Mainly for tourists (Pang Nga)
d/ Includes fish trading
e/ 74 % in farming
f/ 27 % in mining and 27 % in boat driving
g/ The total is larger than the sum of the raws involving non-fishing (NF) in Table 2 because some persons have more than one non-fishing occupation

Note: The number of persons practising various occupations do not sum up to the sample size and the corresponding percentages do not sum up to hundred because these occupations are not mutually exclusive
Source: Panayotou, et al. (1982)

Table 4

Frequency distribution of non-fishing jobs[a/] by type of activity (household members), in four coastal provinces, Thailand, 1978

Non-fishing occupations	CHUMPORN		NAKHON		TRAT		PANG NGA		TOTAL	
	No. of persons	%	No. of persons	%	No. of persons	%	No. of persons	%	No. of persons	%
A. Farming	126	71.19	23	29.86	29	50.00	17	10.43	195	41.05
1. Crop farming (cf. rice)	35	19.78	15	19.47	4	6.70	6	3.68	60	12.63
2. Fruit orchard	12	6.78	-	-	7	12.07	3	1.84	22	4.63
3. Plantation	71	40.11	2	2.60	18	31.03	3	1.84	94	19.79
4. Livestock	8	4.52	5	6.49	-	-	1	0.61	14	2.05
5. Fish farming	-	-	1	1.30	-	-	4	2.45	5	1.05
B. Resource extraction	2	1.13	2	2.60	-	-	17	10.43	21	4.42
1. Small-scale mining	1	0.56	-	-	-	-	14	8.59	15	3.16
2. Mangrove cutting	1	0.56	2	2.60	-	-	3	1.84	6	1.26
C. Small business	15	8.47	17	22.08	11	18.97	43	26.38	86	13.11
1. Boat operation/rental	1	0.56	-	-	-	-	9	5.52	10	2.11
2. Retail trade	14	7.91	17	22.08	11	18.97	34	20.86	76	16.00
D. Wage employment	32	18.08	34	44.16	17	29.31	75	46.01	158	33.26
1. Government office	1	0.56	-	-	-	-	2	1.23	3	0.63
2. Construction (cf.carpentry)	3	1.70	-	-	-	-	-	-	3	0.63
3. Unskilled labour	28[b/]	15.82	34[c/]	44.16	17	29.31	73[d/]	44.78	152	32.00
E. Other[e/]	2	1.13	1	1.30	1	1.72	11	6.75	15	3.16
F. Total[f/]	177		77		58		163		475	

a/ Few of these jobs are full-time or permanent; the great majority of them are part-time, seasonal or temporary
b/ Of this 54 % is in fish processing
c/ 65 % is in farming and 21 % in fish processing
d/ Mining alone accounts for 48 %
e/ Includes dress makers
f/ The total is larger than the sum of the raws involving non-fishing (NF) in Table 2 because some persons have more than one non-fishing occupation

Note: The number of persons practising various occupations do not sump up to the sample size and the corresponding percentages do not sum up to hundred because these occupations are not mutually exclusive

Source: Panayotou, et al. (1982)

Table 5

Perception of employment opportunities and occupational mobility (willingness to change) among fishing household heads in four coastal provinces, Thailand 1978

	Chumporn		Nakhon[a]		Trat		Pang Nga		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Knowledge of jobs available in the vicinity of the community										
- Yes	77	36.2	87	31.0	26	19.6	65	32.7	255	30.9
- No	136	63.8	194	69.0	107	80.4	134	67.3	571	69.1
TOTAL	213	100.0	281	100.0	133	100.0	199	100.0	826	100.0
Type of job available										
- Plantation farming	3	3.9	-	-	4	15.4	4	6.2	11.0	4.3
- Rice farming	3	3.9	4	4.6	-	-	-	-	7.0	2.8
- Retail trading	3	3.9	12	13.8	-	-	14	21.5	29.0	11.4
- Fish processing	5	6.6	2	2.3	3	11.5	2	3.1	12.0	4.7
- Hired labor	62	81.7	69	79.3	19	73.1	27	41.5	177.0	69.7
- Mining	-	-	-	-	-	-	18	27.7	18.0	7.1
TOTAL	76	100.0	87	100.0	26	100.0	65	100.0	254.0	100.0
Reasons for not changing occupation										
- Attachment to fishing	2	3.3	2	2.4	2	7.7	9	13.8	15	6.4
- Old age	12	20.0	7	8.6	3	11.5	6	9.2	28	12.1
- Lower income	28	46.7	48	58.5	20	77.0	27	41.6	123	52.8
- Dislike job available	14	23.3	13	15.9	1	3.8	10	15.4	38	16.3
- Other (far from home, not all-year job)	4	6.7	12	14.6	-	-	13	20.0	29	12.4
TOTAL	60	100.0	82	100.0	26	100.0	65	100.0	233	100.0
Interest in industrial employment (factories)										
- Yes	131	61.8	212	74.9	68	51.5	160	66.9	571	65.9
- No	81	38.2	71	25.1	64	48.5	79	33.1	295	34.1
TOTAL	212	100.0	283	100.0	132	100.0	239	100.0	866	100.0
Reason for not interested in working in factories										
- Low salary	7	8.6	3	4.2	3	4.1	9	11.4	22	7.2
- Not enough free time	1	1.2	3	4.2	2	2.7	1	1.3	7	2.3
- No freedom	16	19.8	16	22.5	14	19.2	17	21.5	63	20.7
- Satisfied with income from fishing	11	13.6	3	4.2	8	11.0	3	3.8	25	8.2
- Poor health (old age)	6	7.4	6	8.5	9	12.3	15	18.9	36	11.9
- No experience	2	2.5	2	2.8	8	11.0	4	5.1	16	5.3
- Other	5	6.2	12	16.9	3	4.1	1	1.3	21	6.9
- No answer	33	40.7	26	36.7	26	35.6	29	36.7	114	37.5
TOTAL	81	100.0	71	100.0	73	100.0	79	100.0	304	100.0
Are family members allowed to take employment in factory?										
- Yes	154	76.2	216	79.1	74	59.2	199	88.1	643	77.8
- No	48	23.8	57	20.9	51	40.8	27	11.9	183	22.2
TOTAL	202	100.0	273	100.0	125	100.0	226	100.0	826	100.0
Knowledge about fish farming of fishermen										
- Yes	77	36.2	122	42.4	53	38.7	82	33.4	334	37.8
- No	136	63.8	166	57.6	84	61.3	164	66.6	550	62.2
TOTAL	213	100.0	288	100.0	137	100.0	246	100.0	884	100.0
Type of fish farming known										
- Shrimp farming	54	70.1	97	79.5	28	52.8	53	66.3	232	69.9
- Shell fish farming	12	15.6	12	9.8	20	37.7	6	7.5	50	15.1
- Fish and crab farming	10	12.0	1	0.8	1	1.9	14	17.5	26	7.8
- No answer	1	1.3	12	9.8	4	7.6	7	8.7	24	7.2
TOTAL	77	100.0	122	100.0	53	100.0	80	100.0	332	100.0
Willingness to move from fish capture to fish culture under government assistance										
- Yes	105	61.1	204	77.9	58	59.3	187	81.7	554	72.8
- No	67	38.9	58	22.1	40	40.8	42	18.3	207	27.2
TOTAL	172	100.0	262	100.0	98	100.0	229	100.0	761	100.0

a/ Nakhon Sri Thammarat

The main reason given by the majority of the respondents, 53 percent, for not changing occupation was that the income they expected from alternative occupations was lower than their current income. Sixteen percent said that they disliked the job available, 12 percent that they were too old to switch occupation and another 12 percent thought the new job had some undesirable feature such as distance from home and seasonality. Only six percent openly admitted that they felt an attachment to fishing as a way of life. The least responsive to economic factors (42 percent) appeared to be the Pang Nga households which also indicated the strongest attachment to fishing (14 percent). Most responsive to economic factors were the Trat households which, with a majority of 77 percent, pointed to "lower income" as their principal justification for rejecting the next best available employment opportunity.

From the above information two provisional conclusions may be made: (a) fishing households are responsive to economic incentives but their response (or mobility) is limited by non-economic factors such as age and occupational preference; (b) the responsiveness to economic incentives (income differentials) varies considerably across locations, being higher in centrally located communities (Trat, Chumporn) than in isolated ones (Pang Nga)1/.

Two possible alternative employment opportunities for small-scale fishermen are unskilled industrial employment and fish culture. Two-thirds of the fishermen expressed interest in industrial employment if they could earn a higher income. An ever higher percentage (78 percent) of fishermen were prepared to send other family members to work in factories for an attractive wage. Surprisingly, fishermen in the two poorest provinces of Nakhon and Pang Nga expressed more interest in industrial employment than fishermen in the better-off provinces of Chumporn and Trat. Those who rejected industrial employment as a possibility gave reasons such as loss of freedom, old age, and contentment with fishing income, although more than one-third gave no reason whatsoever.

Only 38 percent of the respondents had knowledge of fish culture (mainly shrimp) but as many as 73 percent were willing to move from fish capture to fish culture with government assistance. Again, fishermen in Pang Nga were more anxious to make such a switch2/.

The conclusion to be drawn from the above responses is that fishermen appear more enthusiastic and eager to respond to alternatives when these are hypothetical rather than real. Yet, potential mobility is still far from perfect: two-thirds to a quarter of the fishermen were not willing to change occupation even for a substantially higher income. It does seem unwarranted, given the above information, to conclude that fishermen in isolated (and therefore poor) fishing communities are less responsive than fishermen in more centrally located or more progressive communities. The evidence thus far is inconclusive.

Tables 6 and 7 give evidence that occupational mobility is more limited than indicated by responses to hypothetical possibilities. While 77 percent of Chumporn households sampled in 1983 argued that the fishing occupation is becoming less profitable (i.e., worsening vis-a-vis other occupations), only 30 percent had made any attempt to change occupation and as many as 71 percent were determined to continue fishing in the future. In Pang Nga, though 60 percent thought fishing was worsening (Table 6), only 27 percent made any attempt to change occupation and as many as 87 percent said they will continue fishing (Table 7).

However, fishermen wished differently for their children. More in line with their perception of dim prospects for fishing, the majority of the respondents (77 in Chumporn and 54 in Pang Nga) expressed the desire to see their children take up non-fishing occupations (Table 6).

1/ The Nakhon Sri Thammarat fishing communities are also isolated but their extreme poverty puts a premium on income as a principal criterion for selecting employment.

2/ More recently FAO-supported mariculture projects were initiated in Pang Nga and some fishermen have reported higher incomes from these projects during the 1983 survey.

Table 6

Fishermen's perception of the outlook and prospects of fishing occupation in selected fishing villages in Chumporn and Pang Nga Provinces of Thailand 1983 (in percent)

Province/ subdistrict/ village	Sample size	Outlook of fishing occupation				Should children take up fishing?		
		Better	Worse	No change	Uncertain	Yes	No	Uncertain
CHUMPORN								
Paknam								
Village 2	6	0	50	17	33	0	83	17
Village 3	5	0	60	20	20	80	20	0
Village 4	13	0	85	0	15	0	85	15
Village 5	11	0	91	9	0	27	73	0
Village 7	3	33	67	0	0	33	33	33
Natoong								
Village 3	18	6	83	0	11	6	79	6
Village 4	8	13	63	25	0	13	88	0
Total	64	5	77	8	11	16	77	8
PANG NGA								
Panyee								
Village 1	6	0	67	33	0	17	83	0
Village 2	28	14	61	18	7	39	54	7
Village 3	21	0	62	19	19	24	67	10
Bangtae								
Village 5	6	33	33	17	17	33	50	17
Village 6	26	19	58	15	8	54	38	8
Total	87	13	59	18	10	38	54	8

Table 7

Fishermen's perception of alternatives to fishing; willingness and plans for change, Chumporn and Pang Nga Provinces, Thailand 1983

	Chumporn (N=64)	Pang Nga (N=87)
A. Income from next best alternative occupation		
1. Not greater than fishing	38	18
2. Greater than fishing	11	18
3. Uncertain	51	64
Total	100	100
B. Best alternative occupation		
1. Merchant	14	0
2. Carpenter	7	0
3. Hired labor	7	7
4. Coconut farming	43	14
5. Agency	7	0
6. Rice farming	22	7
7. Fish culture	0	43
8. Fish processing (shrimp paste)	0	7
9. School janitor	0	7
10. Charcoal making	0	15
Total	100	100
C. Main reason for not taking up - next best alternative occupation		
1. High capital requirement	20	33
2. Risk	13	11
3. Loss of work independence	20	0
4. Not complementary with other - activities	12	11
5. No land	25	0
6. Inadequate family labor to oversee	9	0
7. Will change	0	33
8. Invested already and will continue	0	11
Total	100	100
D. Knowledge of urban wage rate		
Yes	61	24
No	39	52
Uncertain	0	24
Total	100	100
E. Reported urban wage rate (baht/day)		
Below 50	15	5
50-69	44	52
70-89	26	28
Over 90	15	15
Total	100 (39)	100 (21)
F. Knowledge of fish culture		
Yes	41	49
No	59	35
Uncertain	0	16
Total	100	100

Table 7 (cont.)

	Chumporn (N=64)	Pang Nga (N=87)
G. Type of fish culture		
Shrimp	5	61
Fish	77	11
Shell fish	16	22
Crab	2	6
Total	100 (36)	100 (18)
H. Plan to switch from fishing to fish culture		
Yes	14	40
No	75	31
Uncertain	11	29
Total	100	100
I. Type of land farmed		
1. Free public land	0	16
2. Free father's land	5	0
3. Free relative's land	0	1
4. Rented land	5	0
5. Own land	57	16
6. No land	33	67
Total	100	100
J. Land title		
1. Complete ownership[a]/ (Chanot)	33	14
2. Nor Sor b/	45	29
3. Sor Kor c/	22	36
4. No answer	0	21
Total	100 (42)	100 (14)
K. Have attempted to change occupation recently		
Yes	30	27
No	70	73
Total	100	100
L. Plan to continue fishing in the future		
Yes	71	87
No	29	13
Total	100	100

( ) Number in parenthesis indicates actual number of household reporting (when different from total sample)

a/ Accepted by banks as collateral and is legally transferable

b/ Not accepted by banks as collateral but legally transferable

c/ Possession title, neither acceptable as collateral nor legally transferable; it can be revoked.

Table 7 reports also on fishermen's perception of possible alternatives to fishing and their willingness to take up some of these alternatives. Coconut plantations, rice farming and retail trade in Chumporn and fish farming, charcoal making and coconut farming in Pang Nga were seen as next best alternatives to fishing. The main reasons given for shying away from these activities include lack of land, high capital requirement and loss of independence. Almost 50 percent of the farmers in Pang Nga were familiar with fish culture and planned to switch from fishing to fish farming. Chumporn fishermen, however, were less familiar and less enthusiastic with fish culture, preferring crop and tree farming. This is understandable in the light of their respective resource endowment: 57 percent of Chumporn fishermen own farmland and another 10 percent have access to it; in Pang Nga only 16 percent own land and another 16 percent is squatting on public land; the rest are landless. In Pang Nga, however, there are plenty of brackish waters and suitable coastal areas for brackish-water culture and mariculture.

One last piece of information given in Table 7 has to do with land titles which have an indirect but potent affect on both occupational and geographical mobility. An insecure title not only diminishes the value of land but also deprives the "owner" of both the incentive and the means to improve the land and put it to its best use. Anything less than a full title (Chanot) is not acceptable as collateral by banks in Thailand, thus, depriving the owner of access to low-interest institutional credit. Moreover, land under possessory titles (Sor Kor) is, in addition, non-transferable; its possession is assured only by the holder's physical presence, thereby limiting his/her geographical mobility. As seen in Table 7 (J Section), only 33 percent of the land-owning households in Chumporn and 14 percent in Pang Nga had a full title to the land. As many as 36 percent in Pang Nga and 22 percent in Chumporn had only possessory title.

Fishermen in both locations identified fishery resource depletion and high fishing costs relative to revenues as the main problems facing the fishing occupation (Table 8). Location-specific problems were competition with large trawlers and attacks by sea pirates in Chumporn and mesh size regulation and bad weather conditions in Pang Nga. "Loss" of land to speculators was also blamed for the increasing pressure on fishery resources by 10 percent of the sampled Pang Nga fishermen. Having sold their land to speculators, they chose fishing over tenant-farming.

The main constraints inhibiting the expansion of non-fishing occupations were thought to be lack of land and water for the expansion of farming and inability to sell on cash or to collect debts (both locations) and poor infrastructure (Pang Nga) for the expansion of retail trade (see Table 9). Financial assistance, public utilities and control of fishing activities were suggested as the main means through which the government can help improve the socio-economic conditions of fishing communities in both Chumporn and Pang Nga (see Table 10).

4.3 Recent occupational changes

Thus far, we have reviewed the occupational background of households and their attitudes towards occupational change. In this section, we discuss the actual occupational changes that occurred during the past five years (1978-83) in selected villages in Chumporn and Pang Nga provinces. The objective is to provide quantitative measures of entry into and exit from fishing and non-fishing occupations. We consider three fishing occupations, namely own fishing, hired fishing labour, and fish processing and three non-fishing occupations, namely farming, hired non-fishing labour and "others". Net entry into (net exit from) an occupation is defined as a positive (negative) change in some measure of "effort" supplied to that occupation. Three measures of effort are used here: number of households involved in, number of persons engaged in, and number of man-days of labour supplied to each occupation. The net change in these measures of "effort" between 1978 and 1983 are expressed as proportion of their 1978 levels.

According to Table 11, between 1978 and 1983 virtually all sampled villages in Chumporn experienced net exit of households, persons and man-days of labour from "own fishing". Overall, the number of households with at least one member engaged as fishing boat operator was reduced by 26 percent, the number of persons actually engaged in own fishing fell by 29 percent, and the number of man-days supplied to own fishing dropped

Table 8

Fishermen's perception of problems with fishing as an occupation in Chumporn and Pang Nga Provinces, Thailand, 1983 (in percent)

	Chumporn	Pang Nga
The fish are decreasing	33	29
Large boats take most of the fish	18	4
Income is too low and costs are too high	21	19
Poor fishing equipment	8	2
Bad weather conditions and long distance	2	14
Government regulations of fishing nets	2	22
Fear of pirates and thieves	10	-
Use of TNT by some persons	6	-
Loss of land to land speculators	-	10
TOTAL	100.0	100.0

Table 9

Fishermen's perception of problems with non-fishing occupations in Chumporn and Pang Nga Provinces, Thailand, 1983 (in percent)

	Chumporn	Pang Nga
Insufficient water for rice growing	24	-
Insects eat crops	18	-
Do not own sufficient land	29	43
Unstable price and income	12	-
Merchants cannot get cash from customers	13	15
Not enough customers for boat services and merchant occupation	4	14
No electricity	-	14
Inconvenient transportation	-	14
TOTAL	100.0	100.0

Table 10

Fishermen's suggestions to improve their economic and social conditions in Chumporn and Pang Nga Provinces, Thailand 1983 (in percent)

	Chumporn	Pang Nga
Government should provide utilities, roads and clinics	37	13
Fishmeal industries should have pollution control	5	7
Government should provide financial assistance	27	47
More drinking water required	5	6
Gasoline and licence prices should be reduced	10	-
Government control of middlemen and those persons who use TNT is required	16	7
Government law to control fishing activity is needed	-	20
TOTAL	100.0	100.0

by 45 percent. In contrast, there has been some net entry into fish processing (about 15 percent increase in households, persons and man-days). There has also been considerable increase in the number of households (43 percent) and persons (63 percent) engaged in hired fishing labour but the total labour supplied in terms of man-days did not change. This implies a move towards part-time engagement in hired fishing labour: a crewman in 1983 supplied only 168 man-days of labour compared to 266 man-days in 1978. As a whole, the fishing sector experienced a net exit: 14 percent in terms of households, 12 percent in terms of persons and 26 percent in terms of man-days.

In contrast, during the same time in the same province, there has been considerable increase in labour supply to non-fishing occupations (90 percent) and a net entry of persons (30 percent), although there was little increase in the number of households involved (4 percent). This was simply due to the fact that in 1978 over 90 percent of the sampled households were already engaged in some non-fishing occupation; in 1983 they simply increased their participation in non-fishing activities at the expense of fishing. Of the seven fishing villages sampled only one (village 7) had experienced increase in fishing labour supply at the expense of non-fishing activities. Among the non-fishing occupations, farming experienced some net exit (in terms of man-days and households) while hired unskilled labour and other non-resource based occupations (e.g., retail trade) experienced tremendous net entry. The number of households engaged in hired labour increased by 57 percent and that in other occupations by 69 percent. Even more spectacular was the net entry of persons and the increase in labour supply to these occupations; the latter nearly tripled between 1978 and 1983 (see Table 12).

Table 11

Exit from and entry into different fishing occupations measured in man-days, persons and households between 1978 and 1983, selected villages in Muang District, Chumporn Province, Thailand

	Own fishing			Fish processing			Hired fishing labour			Total		
	1978	1983	%Δ	1978	1983	%Δ	1978	1983	%Δ	1978	1983	%Δ
Paknam												
Village 2												
Man-days	1,795	630	-65	1,016	590	-42	778	1,045	34	3,591	2,265	-37
Persons	10	3	-70	8	3	-63	3	4	33	20	10	-50
Households	5	1	-80	4	2	-50	2	3	50	6	5	-17
Village 3												
Man-days	1,194	1,059	-11	2,208	208	-91	1,155	600	-48	4,557	1,867	-59
Persons	7	6	-14	6	3	-50	4	3	-25	17	12	-29
Households	3	3	0	3	2	-33	3	2	-33	5	4	-22
Village 4												
Man-days	4,459	1,467	-67	126	1,505	+1,094	465	865	86	5,050	3,837	-24
Persons	20	8	-60	1	7	+600	3	5	150	23	19	-17
Households	13	7	-46	1	5	800	2	4	100	13	10	-23
Village 5												
Man-days	2,679	2,021	-25	1,296	3,261	152	1,177	1,050	-11	5,152	6,332	23
Persons	12	14	-17	5	12	140	3	6	100	21	28	33
Households	9	9	0	2	5	150	2	4	100	10	9	-10
Village 7												
Man-days	432	833	+93	-	-	-	-	-	-	432	833	93
Persons	3	4	33	-	-	-	-	-	-	3	4	33
Households	3	3	0	-	-	-	-	-	-	3	3	0
Natoong												
Village 3												
Man-days	5,368	2,343	-56	228	0	-100	1,487	1,413	-5	7,083	3,756	-47
Persons	22	17	-23	2	0	-100	6	9	50	30	26	-13
Households	13	11	-15	2	0	-100	5	5	0	18	15	-20
Village 4												
Man-days	1,758	1,303	-26	-	-	-	-	224		1,758	1,527	-13
Persons	13	10	-23	-	-	-	-	3		13	13	0
Households	8	6	-25	-	-	-	-	2		8	8	0
TOTAL												
Man-days	17,687	9,656	-45	4,874	5,564	14	5,062	5,197	+3	27,623	20,417	-26
Persons	87	62	-29	22	25	14	19	31	+63	127	112	-12
Households	54	40	-26	12	14	17	14	20	+43	63	54	-14

% Δ : Percentage change between 1978 and 1983
- : Negligible

Table 12

Exit from and entry into different non-fishing occupations measured in man-days, persons and households, between 1978 and 1983, selected villages in Muang District, Chumporn Province, Thailand

	Farming			Hired non-fishing labour			Other			Total		
	1978	1983	% Δ	1978	1983	% Δ	1978	1983	% Δ	1978	1983	% Δ
Paknam												
Village 2												
Man-days	-	-	-	-	103		612	1,758	187	612	1,861	207
Persons	-	-	-	-	2		2	5	150	2	5	150
Households	-	-	-	-	1		2	5	150	2	5	60
Village 3												
Man-days	43	274	535	90	210	133	888	488	-45	1,021	972	-5
Persons	2	4	100	2	1	-50	3	4	33	3	7	133
Households	1	1	0	1	1	0	2	2	0	4	5	25
Village 4												
Man-days	332	394	18	155	2,508	1,518	329	1,991	505	816	4,893	500
Persons	13	19	46	2	4	100	3	9	200	18	31	72
Households	11	12	9	2	3	50	3	4	33	12	13	8
Village 5												
Man-days	675	413	-39	576	0	-100	17	2,645	15,930	1,268	3,058	141
Persons	12	11	-8	3	1	0	1	12	1,100	16	19	19
Households	10	9	-10	2	1	0	1	6	500	11	10	9
Village 7												
Man-days	139	5	-96	300	0	-100	71	90	26	510	95	-81
Persons	2	1	-100	1	0	-100	1	1	0	4	2	-50
Households	1	1	0	1	0	-100	1	1	0	3	2	-33
Natoong												
Village 3												
Man-days	1,217	1,103	-13	360	313	-13	1,623	1,543	-5	3,254	2,959	-9
Persons	27	28	4	1	5	400	7	12	71	32	35	9
Households	15	13	-15	1	3	200	7	8	14	17	15	-12
Village 4												
Man-days	535	496	-7	-	-	-	-	500		535	1,446	170
Persons	13	11	-15	-	-	-	-	2		13	15	15
Households	8	7	-13	-	-	-	-	1		8	9	13
TOTAL												
Man-days	2,995	2,685	-10	1,481	3,584	142	3,540	9,015	155	8,016	15,284	90
Persons	68	74	9	9	15	67	17	45	165	88	114	30
Households	46	43	-7	7	11	57	16	27	69	57	59	4

% Δ : Percentage change between 1978 and 1983
- : Negligible

In Pang Nga the picture has been mixed. While there has been no significant change in the number of persons engaged in fishing, the number of households involved in fishing fell by eight percent while the labour supply to fishing dropped by -30 percent (Table 13). Again this implies a move towards more part-time engagement in fishing: on the average the supply of labour to fishing was reduced from 169 man-days per person per year to 103 man-days/person/year. The labour supply to all fishing occupations dropped more or less by the same proportion. The number of households and persons engaged in hired fishing labour, however, rose considerably, while 19 percent fewer households were engaged in fish processing. These changes were more or less uniform among the five villages studied.

In contrast, non-fishing occupations in Pang Nga have generally declined. The number of households engaged in non-fishing activities dropped by 30 percent, the number of persons by 28 percent and labour supply by 37 percent (see Table 14). While there has been exit of either households or persons from all non-fishing occupations, "others", primarily mining and retail trade, account for much of the decline. The labour supply to these occupations was reduced by 45 percent and was supplied by 38 percent fewer persons. In conclusion, the data for Pang Nga indicate exit from non-fishing, entry into fishing and more specialization of households in one of these groups of activities (since there was some decline in the number of households in both activities).

A maintained, but often untested, hypothesis is that those who leave the fishery differ significantly from those who enter or stay in the fishery in terms of sociodemographic characteristics such as age, education, sex, and marital status. The presumption is that those leaving the fishery are usually single males, younger and more educated than those who either enter or continue to stay in the fishery. In Table 15 we tested this hypothesis for Chumporn and found that new entrants were usually young (under 30), male (64 percent), single (80 percent) and with above-average education (5.3 years). Persons leaving the fishery were generally older (above 30) and hence less likely to be single (53 percent), with a more balanced representation of the sexes (59 percent male) but less educated (3.8 years) than those who entered the fishery. Fishermen with at least five years in the fishery who continued fishing in 1983 (and had no plans to leave) were generally older (over 40) than the other two groups, predominantly males (85 percent), married (79 percent) and with a higher education (4.4. years) than those leaving the fishery but lower than those entering (see Table 15). This last finding is somewhat surprising since compulsory education was introduced only recently.

In Pang Nga the same conclusions hold about age and marital status, but somewhat surprising for a Muslim society the sexes were more equally represented among all three groups than they were in Chumporn. The educational level of the new entrants was again higher than the other two groups (though lower than in Chumporn) but there was no significant difference in educational level between those who stopped and those who continued fishing (see Table 16).

A number of conclusions may be drawn from this section. First, there appears to be considerable mobility in and out of the fishery (and other occupations). Second, the small-scale fishery is experiencing net exit in some areas and net entry in others but, on balance, there seems to be a trend towards more exit than entry (more so in the Gulf of Thailand than in the Andaman Sea). Third, there is a mild trend towards specialization into fishing and non-fishing households. Fourth, a reduction in the supply of labour to fishing does not mean a corresponding increase in labour supply to non-fishing activities and vice versa; households may simply increase leisure or time spent in education (for instance, in Pang Nga labour supply to both fishing and non-fishing activities was reduced). Fifth, the new entrants into the fishery are predominantly,but not exclusively, single males, younger and more educated than those who either stay in or leave the fishery. Those who leave are usually men and women in their early to mid-thirties starting their own families; having spent four to seven years in fishing, they find the job unsatisfactory and move to other occupations particularly hired labour. Thus, fishing is increasingly becoming the occupation of the veteran fishermen (own-account small-scale fishing) and the adventurous (hired fishing labour on the large-scale distant-water fleet which is a high-return, high-risk occupation).

Table 13

Exit from and entry into different fishing occupations measured in man-days, persons and households, between 1978 and 1983, selected villages in Muang District, Pang Nga Province, Thailand

	Own fishing			Fish processing			Hired fishing labor			Total		
	1978	1983	%Δ	1978	1983	%Δ	1978	1983	%Δ	1978	1983	%Δ
Panyee												
Village 1												
Man-days	1,051	459	-56	104	116	12	-	100		1,155	576	-50
Persons	9	13	44	4	4	0	-	1		12	16	33
Households	6	6	0	3	3	0	-	1		6	6	0
Village 2												
Man-days	8,093	6,963	-14	1,511	1,901	26	2,025	910	-55	11,629	9,774	-16
Persons	42	51	21	13	25	92	2	0	350	62	75	18
Households	28	27	-4	11	15	36	1	4	300	28	27	- 4
Village 3												
Man-days	6,686	4,010	-40	2,081	1,032	-50	14	525	3,789	8,781	5,567	-37
Persons	37	38	3	12	17	-23	1	1	0	56	44	-21
Households	21	19	-11	16	9	-44	1	1	0	21	19	-10
Bangtae												
Village 5		2,157	-31	884		-45						
Man-days		1,366			483		-	-	-	3,041	1,849	-39
Persons	17	13	-24	5	8	60	-	-	-	18	14	-22
Households	6	5	-16	5	4	-20	-	-	-	6	5	-17
Village 6												
Man-days	7,500	4,693	-37	2,725	1,948	-29	114	0	-100	10,339	6,641	-36
Persons	49	39	-20	27	21	-22	2	0	-100	58	55	-5
Households	25	23	8	19	13	-32	2	0	-100	26	23	-12
TOTAL												
Man-days	25,487	17,491	-31	7,305	5,480	-25	2,153	1,535	-29	34,945	24,407	-30
Persons	154	154	0	71	75	6	5	11	120	206	202	-2
Households	86	80	-7	54	44	-19	4	6	50	87	80	-8

% Δ : Percentage of change between 1978 and 1983
- : Negligible

Table 14

Exit from and entry into different non-fishing occupations measured in man-days, persons and households, between 1978 and 1983, selected villages in Muang District, Pang Nga Province, Thailand

	Farming			Hired non-fishing labor			Other			Total		
	1978	1983	%Δ	1978	1983	% Δ	1978	1983	% Δ	1978	1983	%Δ
Panyee												
Village 1												
Man-days	-	-	-	-	934		2,871	928	-68	2,871	1,862	-35
Persons	-	-	-	-	3		11	5	-36	11	8	-27
Households	-	-	-	-	3		6	4	-17	6	5	-17
Village 2												
Man-days	530	-	-100	1,120	672	-40	6,080	5,961	-2	7,730	6,633	-14
Persons	5	-	-100	8	3	-75	21	31	48	34	34	0
Households	5	-	-100	5	3	-75	11	17	55	18	20	11
Village 3												
Man-days	520	726	40	355	155	-56	4,760	2,991	-37	5,635	3,872	-31
Persons	5	7	40	4	1	-75	26	13	-50	35	21	-40
Households	2	3	50	4	1	-75	16	8	-50	18	10	-45
Bangtae												
Village 5												
Man-days	-	-		-	169		1,008	505	-50	1,177	677	-42
Persons	-	-		-	3		2	4	100	5	5	0
Households	-	-		-	2		1	2	100	1	2	10
Village 6												
Man-days	230	810	252	539	532	-1	6,341	1,047	-83	7,110	2,389	-66
Persons	3	12	300	4	4	0	32	5	-84	39	18	-53
Households	2	4	100	3	3	0	18	4	-78	22	9	-59
TOTAL												
Man-days	1,280	1,539	20	2,014	2,462	22	21,060	11,432	-45	24,523	15,433	-37
Persons	13	20	54	16	14	-13	92	58	-36	119	86	-28
Households	9	8	-12	12	12	0	52	35	-33	65	46	-30

%Δ : Percentage of change between 1978 and 1983, - : Negligible

Table 15

Average age, education, sex and marital status of persons who (a) entered fishing, (b) left fishing and (c) continued fishing during the past five years (1978-83) in selected villages of Chumporn Province, Thailand

	Entered fishing						Left fishing						Continued fishing					
	Number of persons[a]	Age	Education	Sex (%F)	Marital status S %	M %	Number of persons[a]	Age	Education	Sex (%F)	Marital status S %	M %	Number of persons[a]	Age	Education	Sex (%F)	Marital status S %	M %
Paknam																		
Village 2	3	17	7.3	46	100	-	13	35	2.5	67	23	77	7	34	4.4	14	29	71
Village 3	6	21	3.8	33	80	20	11	33	4	55	36	64	6	40	4.0	19	33	67
Village 4	10	25	5.7	8	80	20	14	34	3.8	70	57	43	9	45	3.6	11	-	100
Village 5	14	22	4.6	43	86	14	7	24	4.3	44	71	29	14	37	4.0	14	43	57
Village 7	2	32	7.0	100	50	50	1	40	0.0	0	-	100	2	44	8.0	0	-	100
Natoong																		
Village 3	11	27	5.1	33	64	36	15	36	4.0	45	40	60	15	43	4.3	13	20	80
Village 4	4	19	7.3	50	100	-	4	28	6.8	0	25	75	9	49	5.4	22	-	100
TOTAL	50	23	5.3	36	80	20	65	33	3.8	53	41	59	62	42	4.4	15	21	79

S : Single
M : Married
F : Female

[a] A sample of those who entered, left, or continued fishing

Table 16

Average age, education, sex and marital status of persons who (a) entered fishing, (b) left fishing and (c) continued fishing during the past five years (1978-83) in selected villages of Pang Nga Province, Thailand

	Entered fishing						Left fishing						Continued fishing					
	Number of persons[a]	Age	Education	Sex (%F)	Marital status S %	M %	Number of persons[a]	Age	Education	Sex (%F)	Marital status S %	M %	Number of persons[a]	Age	Education	Sex (%F)	Marital status S %	M %
Punyee																		
Village 1	8	31	3.3	25	50	50	4	21	5.5	25	100	-	8	41	1.7	43	-	100
Village 2	35	27	4.9	49	74	26	24	33	3.0	45	25	75	38	44	3.7	31	11	89
Village 3	15	24	5.1	56	53	47	27	33	2.8	53	41	59	29	40	2.9	21	-	100
Bangtae																		
Village 5	5	25	4.6	22	40	60	9	24	3.3	40	44	56	9	40	2.8	22	11	89
Village 6	21	31	4.9	41	33	67	24	31	3.3	43	33	67	34	40	2.8	23	18	82
TOTAL	84	28	4.7	44	56	44	88	31	3.2	45	37	63	118	41	3.0	26	9	91

S : Single
M : Married
F : Female

[a] A sample of those who entered, left, or continued fishing

4.4 Labour supply

In the preceding section, we have seen that over the past five years there has been considerable mobility of labour between fishing and non-fishing occupations. This evidence suffices to reject the hypothesis that fishermen are occupationally immobile. However, mobility is not an absolute concept. There are different degrees of mobility as there are different degrees of elasticity in the conventional theory of demand and supply. Moreover, not all occupational changes may be characterized as occupational mobility. People may change occupation or change their supply of labour to a given occupation for a variety of reasons such as health, age, social status, imitation of neighbours and coercion, as well as for economic reasons. As we have explained in the analytical framework (Chapter 2), occupational mobility is defined here more narrowly to mean occupational change in response to economic incentives, that is to differential earnings between occupations. However, since a certain differential between occupations is likely to persist because of the differential disutility between occupations, we have defined occupational mobility as a change in the supply of labour between two occupations in response to a change in earnings differential between these occupations. Since our decision unit is the household, we can use this framework to study not only marginal changes in labour supply but also the exit from and entry into different occupations by household members as long as the whole household does not migrate or change radically its occupational portfolio.

Thus, for occupational changes to be characterized as occupational mobility, it must be shown to have been precipitated by changes in earning differentials and must be measured in relation to these differentials. A small change in labour supply in response to a smaller change in wage differentials indicates a higher degree of occupational mobility than a large change in labour supply in response to a larger change in wage differentials. For a formal analytical and empirical model operationalizing these concepts see Appendix A.

For the purpose of applying this methodology we drew a subsample of 111 households from 12 villages in Chumporn and Pang Nga and studied more closely their incomes, employment, wages, assets and labour supply allocation decisions between fishing and non-fishing activities. Tables 17-23 are devoted to the computation of the average household incomes, labour supply wages and assets during 1978 and 1983 and the proportional changes that have occurred over this five-year period. These tables suggest (but do not prove) that changes in labour supply to fishing and non-fishing activities are related to changes in wage differentials. (For a quantitative measurement of this relationship and its statistical significance see Panayotou, D., 1985). A word of caution is in order. The wages, incomes and assets in this study are in nominal terms or current prices. We assume that the households respond to changes in money wages rather than in real wages; that is, we assume money illusion. 1983 figures in current prices can be easily converted into 1978 constant prices by deflating by the consumer price index which rose by about 30 percent in Chumporn and 50 percent in Pang Nga during 1978-1983. In real terms, only non-fishing wages in Chumporn rose between 1978 and 1983; all other real wages dropped dramatically.

As seen in Table 17, in Chumporn the average fishing wage rate fell by four percent and so did the labour supply to fishing resulting in an eight percent drop in the net labour incomes from fishing and a substantially larger reduction in real terms. The value of fishing assets, however, rose by 60 percent. The average household allocated just under 300 man-days to fishing for an average wage of just above 80 baht per day to earn a net income of about 23,600 baht (equivalent to US$ 1,030), or about 2,000 baht less than in 1978. There was clearly a positive relationship between changes in the nominal wage rate and changes in labour supply: in villages where the wage rate fell (rose) the labour supplied to fishing was also reduced (rose). However, fishing assets have moved in the opposite direction suggesting the possibility of capital-labour substitution, itself a sign of "mobility".

In contrast, the average non-fishing wage rose by 54 percent and labour supply to non-fishing activities increased by 76 percent resulting in a 165 percent increase in non-fishing income, from 6,000 baht to 16,000 baht (Table 18), more than offsetting the drop

in fishing income[1/]. (These were the only increases in wages and fishing incomes above the rate of inflation.) While in 1983 there was little difference between fishing and non-fishing wages, the non-fishing wage rate had risen from 52 baht to 80 baht per man-day while the fishing wage had dropped from 85 baht to 82 baht per man-day. In "reponse" households raised their labour supply to non-fishing from 112 man-days to almost 200 man-days per year while reducing their fishing labour only slightly. The net result of these changes has been a rise in the total labour supply per household from 412 to 484 man-days per year and of total income from 31,700 baht to 39,700 baht (see Table 21)[2/]. This was achieved partly at the expense of leisure of previously working members (54 man-days) and partly by increasing the labour force participation of the household from 3.01 members to 3.13 members or 18 man-days (Table 23). Table 21 also suggests a close positive relationship between changes in average wage rates in individual villages and changes in total labour supply in these villages.

The situation in Pang Nga (Tables 19 and 20) was in a sense the reverse of that in Chumporn. In money terms, the profitability of fishing rose appreciably while that of non-fishing activities deteriorated dramatically; in real terms both declined. The average fishing wage rate rose by 22 percent in nominal terms but households reduced their supply of labour to fishing by 19 percent, leaving fishing income unchanged (Table 14). This is hardly surprising when one considers that fishing assets more than doubled from 7,500 baht to 15,800 and that inflation in Pang Nga between 1978 and 1980 was over 50 percent (Table 25). Looking at individual villages we observe that households with large increases in fishing (and total) assets reduced or increased only slightly their labour supply to fishing despite sizeable increases in the fishing wage rate.

In contrast, the non-fishing wage dropped from 84 baht to 57 baht per man-day. Labour supply to non-fishing activities was reduced by 33 percent resulting in a 53 percent drop in non-fishing income. Non-fishing assets also dropped by 74 percent in nominal terms. Non-fishing wage, employment and income all fell consistently in all five villages sampled in the province (see Table 20).

By combining fishing and non-fishing incomes (Tables 21 and 22), we observe that the rise in the fishing wage and the drop in the non-fishing wage offset each other leaving the average wages of Pang Nga households basically unchanged at 85 baht. However, the total labour supply by the average household dropped by 25 percent reducing total labour income proportionately. The nominal value of assets rose somewhat but not sufficiently to counter either the drop in labour income or inflation. Pang Nga households today are definitely worse off in money terms (and more so in real terms) than they were in 1978. They have reduced their labour supply and increased their leisure by 145 man-days and reduced their working members from 3.26 to 3.18 (see Table 24). This is in contrast to Chumporn households, which have increased their labour supply both in terms of man-days and working members and reduced their leisure; recall that the wage rate in Chumporn increased moderately and inflation was almost half that of Pang Nga (Table 25). However, although Chumporn households improved their position between 1978 and 1983 in money terms, they were probably at about the same level in real terms (with less real income from labour and more from property).

Not only has the household's time allocation between labour and leisure changed between 1978 and 1983, but there were also changes in the socio-demographic structure of the household and its working members (see Table 23 and 24). The average family size was

---

1/ The relationship between changes in the wage rate and changes in labour supply in individual villages is mixed (sometimes positive, sometimes negative). Although changes in assets, the price of the consumption basket and the number of working members may account for some of the negative relationships, the small sample of each village and changes within the "non-fishing" group of occupations may also be responsible. At any rate, the total employment and the average wage rate from all occupations are positively related (Table 21). Moreover, the possibility of backward-bending labour supply curve cannot be precluded a priori.

2/ Not only labour income has increased but, as Table 21 shows, households have improved their asset position by over 100 percent earning additional non-labour income. However, as we will see below, inflation in Chumporn ran at the average of 32 percent (see Table 25) nullifying the increase in labour incomes and reducing the real value of assets considerably.

Table 17

Changes in fishing incomes, employment, wages and assets between 1978 and 1983 in selected villages in the Muang District, Chumporn Province, Thailand (average per household)

Subdistrict/ village	Sample size	Labour income[a] (baht)			Employment (man-days)			Wage (baht/man-day)			Assets (baht)		
		1978	1983	%Δ	1978	1983	%Δ	1978	1983	%Δ	1978	1983	%Δ
Paknam													
Village 2	3	13,918 (15,435)[b]	20,280 (13,595)	45.7	207 (211)	320 (200)	54.5	67 (68)	63 (98)	-6.0	31,735 (47,173)	2,800 (3,704)	-91.2
Village 3	2	22,324 (19,341)	17,064 (7,161)	-23.6	410 (438)	380 (198)	-7.3	54 (26)	45 (5.6)	-16.7	1,725 (2,440)	1,850 (2,616)	7.2
Village 4	8	19,813 (18,077)	17,825 (11,368)	-10.0	301 (213)	293 (80)	-2.7	66 (45)	63 (24)	- 7.8	7,032 (3,393)	12,283 (16,137)	74.7
Village 5	7	18,230 (14,593)	35,511 (26,623)	94.8	227 (112)	404 (195)	77.9	80 (45)	88 (56)	10	10,489 (7,613)	37,646 (53,585)	258.9
Village 7	3	26,430 (28,289)	56,511 (44,768)	113.8	213 (128)	318 (214)	49.3	124 (66)	178 (102)	43.5	57,903 (95,583)	63,783 (94,159)	-10.2
Natoong													
Village 3	14	34,205 (27,413)	16,702 (10,500)	-51.2	362 (184)	241 (144)	-33.5	94 (50)	69 (31)	-26.7	22,106 (45,643)	36,506 (71,116)	65.1
Village 4	7	27,567 (22,026)	21,960 (23,612)	-20.3	269 (100)	229 (244)	-14.9	102 (49)	96 (41)	-5.9	9,584 (8,324)	23,786 (28,782)	148.2
TOTAL	44	25,589	23,641	-7.6	300	287	- 4.3	85	82	-3.5	17,696	28,246	59.6

[a] Net of depreciation and opportunity cost of capital

[b] Figures in parentheses are standard deviations from the mean

%Δ : Percentage change between 1978 and 1983

Table 18

Changes in non-fishing incomes, employment, wages and assets between 1978 and 1983 in selected villages in the Muang District, Chumporn Province, Thailand (average per household)

Subdistrict/ village	Sample size	Labour income[a] (baht)			Employment (man-days)			Wage (baht/man-day)			Assets (baht)		
		1978	1983	%Δ	1978	1983	%Δ	1978	1983	%Δ	1978	1983	%Δ
Paknam													
Village 2	3	7,800 (7,275)[b]	20,000 (18,330)	156.4	160 (151)	299 (199)	25.0	48 (25)	67 (81)	28.4	313 (543)	12,727 (15,462)	3966.1
Village 3	2	14,355 (6,852)	11,550 (3,818)	-19.5	191 (69)	199 (46)	4.0	75 (9.3)	58 (23)	-22.7	62,225 (31,430)	357,105 (490,513)	473.9
Village 4	8	8,464 (12,815)	26,343 (38,461)	211.2	113 (130)	351 (415)	231.9	75 (28)	70 (28)	-6.6	41,154 (26,252)	113,013 (147,997)	174.6
Village 5	7	3,193 (2,554)	23,916 (29,708)	649.0	60 (57)	226 (309)	210.6	53 (56)	114 (57)	115.1	66,594 (49,199)	175,394 (213,746)	163.4
Village 7	3	12,583 (2,184)	14,600 (22,491)	16.0	208 (81)	117 (151)	-43.8	60 (68)	125 (71)	108.0	73,400 (47,549)	61,667 (65,256)	-15.9
Natoong													
Village 3	14	4,977 (6,156)	10,312 (11,729)	107.2	113 (127)	139 (153)	23.0	44 (27)	74 (45)	68.1	32,742 (27,858)	93,729 (183,024)	186.3
Village 4	7	2,490 (1,748)	8,135 (7,622)	229.3	78 (50)	113 (101)	-35.0	32 (13)	72 (25)	125.0	39,812 (24,179)	38,546 (25,506)	-3.2
TOTAL	44	6,066	16,054	164.6	112	197	75.8	52	80	53.8	42,683	105,711	147.7

[a] Net of depreciation and opportunity cost of capital

[b] Figures in parentheses are standard deviations from the mean

%Δ : Percentage change between 1978 and 1983

Table 19

Changes in fishing incomes, employment, wages and assets between 1978 and 1983 in selected villages in the Muang District, Pang Nga Province, Thailand (average per household)

	Sample size	Labour income (baht)[a]			Employment (man-days)			Wage (baht/man-day)			Assets (baht)		
		1978	1983	%Δ	1978	1983	%Δ	1978	1983	%Δ	1978	1983	%Δ
Punyee													
Village 1	5	13,422 (5,343)	5,557 (6,867)	-58.6	189 (57)	81 (86)	-57.1	71 (27)	69 (33)	-2.8	2,290 (1,562)	4,630 (4,117)	102.2
Village 2	26	34,432 (29,046)	32,066 (26,652)	-6.9	418 (453)	295 (288)	-29.4	82 (57)	109 (71)	32.9	10,258 (12,684)	25,250 (27,202)	146.1
Village 3	17	17,905 (11,965)	23,319 (15,120)	30.2	239 (150)	224 (116)	-6.5	75 (37)	104 (45)	38.7	5,842 (3,432)	14,694 (12,925)	151.5
Bangtae													
Village 5	4	16,878 (13,863)	27,926 (17,969)	65.4	239 (248)	261 (184)	+9.2	71 (85)	107 (7.2)	50.7	1,316 (333)	7,850 (2,749)	496.5
Village 6	21	28,406 (25,348)	26,072 (16,307)	-8.2	243 (151)	236 (149)	-2.9	117 (47)	110 (36)	-6.0	7,753 (10,867)	9,312 (9,372)	20.1
TOTAL	73	26,448	26,262	-0.7	301	245	-18.6	88	107	21.6	7,476	15,841	111.9

[a] Net of depreciation and opportunity cost of capital

[b] Figures in parentheses are standard deviations from the mean

%Δ : Percentage change between 1978 and 1983

Table 20

Changes in non-fishing incomes, employment, wages and assets between 1978 and 1983 in selected villages in Muang District, Pang Nga Province, Thailand (average per household)

	Sample size	Labour income (baht)[a]			Employment (man-days)			Wage (baht/man-day)			Assets (baht)		
		1978	1983	%Δ	1978	1983	%Δ	1978	1983	%Δ	1978	1983	%Δ
Punyee													
Village 1	5	41,536 (58,654)	25,470 (25,219)	-38.6	590 (721)	399 (363)	-32.3	70 (56)	64 (29)	-8.5	59,838 (115,579)	15,095 (28,494)	-74.8
Village 2	26	14,603 (19,427)	12,265 (14,125)	-16.0	263 (377)	254 (258)	-3.5	56 (130)	48 (138)	-14.3	11,381 (21,462)	67 (202)	-99.4
Village 3	17	19,500 (30,666)	6,096 (9,859)	-68.7	218 (318)	142 (335)	-35.0	89 (97)	43 (84)	-51.7	12,645 (36,429)	1,060 (2,796)	-91.6
Bangtae													
Village 5	4	20,788 (17,904)	11,430 (22,860)	-45.0	139 (102)	96 (191)	-30.9	150 (98)	119 (45)	-20.6	24,975 (14,667)	17,884 (24,006)	28.4
Village 6	21	34,177 (34,342)	9,767 (23,245)	-71.4	305 (316)	123 (224)	-59.8	112 (115)	79 (60)	-29.5	17,352 (29,596)	7,658 (16,542)	55.9
TOTAL	73	23,557	10,968	-53.4	280	191	-33.2	84	57	-32.1	17,488	4,488	-74.3

[a] Net of depreciation and opportunity cost of capital

[b] Figures in parentheses are standard deviations from the mean

%Δ : Percentage change between 1978 and 1983

Table 21

Changes in total incomes, employment, wages and assets between 1978 and 1983 in selected fishing villages in Chumporn Province, Thailand (average per household)

Subdistrict/ village	Sample size	Labour income (baht)[a]			Employment (man-days)			Wage rate			Assets[b]		
		1978	1983	%Δ	1978	1983	%Δ	1978	1983	%Δ	1978	1983	%Δ
Paknam													
Village 2	5	21,718	40,280	85.5	367	520	41.7	59	77	30.5	49,665	17,393	-64.9
Village 3	2	36,679	28,614	-22.0	601	579	-3.7	61	49	-19.7	70,418	393,955	459.5
Village 4	8	28,277	44,168	56.0	414	644	56.0	68	69	1.5	73,326	240,724	228.3
Village 5	7	21,423	58,707	174.8	287	630	119.5	75	93	24.2	118,397	261,897	121.2
Village 7	3	39,013	71,111	82.3	421	435	3.3	93	163	75.3	136,620	125,450	-8.2
Natoong													
Village 3	14	39,182	27,014	-31.1	475	380	-20.0	82	71	-31.4	67,880	151,950	123.9
Village 4	7	30,037	30,095	0.2	347	342	-1.4	87	88	1.2	86,013	76,773	-10.8
TOTAL	44	31,655	39,695	25.4	412	484	17.5	77	82	6.5	83,352	173,635	108.3

[a] Net of depreciation and opportunity cost of capital

[b] Includes house and consumer durables

%Δ : Percentage of change between 1978 and 1983

Table 22

Changes in total incomes, employment, wages and assets between 1978 and 1983 in selected fishing villages in Pang Nga Province, Thailand (average per household)

Subdistrict/ village	Sample size	Labour income[a] (baht)			Employment (man-days)			Wage rate (baht/ man-day)			Assets[b] (baht)		
		1978	1983	%Δ	1978	1983	%Δ	1978	1983	%Δ	1978	1983	%Δ
Panyee													
Village 1	5	54,958	31,027	-43.5	779	480	-38.4	71	65	-8.5	66,166	22,725	-65.8
Village 2	26	39,035	44,331	-9.5	681	549	-19.4	72	81	12.5	35,016	52,644	50.3
Village 3	17	37,405	29,415	-21.4	457	485	6.1	82	61	-26.0	23,500	31,607	34.5
Bangtae													
Village 5	4	37,666	39,356	4.5	378	357	-5.6	100	110	10.0	36,011	46,484	29.1
Village 6	21	62,583	35,839	-43.0	548	359	-34.5	114	100	-12.3	29,184	26,813	8.1
TOTAL	73	50,005	37,230	-25.0	581	436	-25.0	86	85	-1.2	32,845	37,927	15.5

[a] Net of depreciation and opportunity cost of capital

[b] Includes house and consumer durables

% : Percentage of change between 1978 and 1983

Table 23

Changes in family size, working members, women's labour participation and education of working members of fishing household in selected villages in Muang District of Chumporn Province, Thailand

	Sample size	Family size (no. of persons)			Working members (no. of persons)			Ratio of working members to family size			Sex ratio of working members (female/total)			Education of working members (years)		
		1978	1983	%Δ	1978	1983	%Δ	1978	1983	%Δ	1978	1983	%Δ	1978	1983	%Δ
Paknam																
Village 2	6	6.83	6.17	-9.7	3.33	2.67	-19.8	48.8	43.3	-11.3	0.30	0.46	53.3	2.74	3.92	43.1
Village 3	5	8.20	6.20	-24.4	4.40	3.80	-13.6	53.7	61.3	14.2	0.43	0.32	-25.6	4.20	5.29	26.0
Village 4	13	6.08	6.00	-1.3	2.85	3.15	10.5	46.9	52.5	11.9	0.42	0.37	-11.9	3.87	4.77	23.3
Village 5	11	7.18	6.91	-3.8	3.00	3.55	18.3	41.8	51.4	23.3	0.36	0.42	16.7	4.02	4.24	5.5
Village 7	3	6.33	6.33	0.0	2.33	2.33	0.0	36.8	36.8	0.0	0.50	0.28	-72.0	5.67	5.50	-3.0
Natoong																
Village 3	18	5.72	5.78	1.0	2.34	3.28	11.6	51.4	56.7	10.3	0.47	0.42	-10.6	4.22	4.67	10.7
Village 4	8	5.75	4.50	-21.7	2.63	2.38	-9.5	45.7	52.9	15.8	0.46	0.30	-34.8	5.22	5.90	13.0
TOTAL	64	6.54	5.95	-9.9	3.01	3.13	4.0	46.0	52.6	14.3	0.42	0.38	-9.5	4.17	4.79	14.9

%Δ : Percentage of change between 1978 and 1983

Table 24

Changes in family size, working members, women's labour participation and education of working members of fishing household in selected villages in Muang District of Pang Nga Province, Thailand

	Sample size	Family size (no. of persons)			Working members (no. of persons)			Ratio of working members to family size			Sex ratio of working members (female/total)			Education of working members (years)		
		1978	1983	%Δ	1978	1983	%Δ	1978	1983	%Δ	1978	1983	%Δ	1978	1983	%Δ
Punyee																
Village 1	6	6.83	7.17	5.0	3.00	3.50	16.7	43.9	48.8	11.2	0.35	.27	-22.9	3.0	3.32	11.4
Village 2	28	7.07	6.43	-9.1	3.14	3.86	22.9	44.4	60.0	35.1	0.42	.46	9.5	4.1	4.27	4.9
Village 3	21	7.43	7.10	-4.4	3.24	2.67	-17.6	43.6	37.6	-13.8	0.46	.42	-8.7	3.3	3.53	7.3
Bangtae																
Village 5	6	8.67	8.50	2.0	4.33	4.33	0.0	49.9	50.9	2.0	0.37	.31	-16.2	3.7	3.40	-8.6
Village 6	26	7.23	2.5	-10.1	3.23	2.53	-2.7	44.7	38.9	-12.9	0.28	.33	17.9	3.4	3.14	-6.3
TOTAL	87	7.29	6.71	-8.0	3.26	3.18	-2.5	44.1	46.9	5.0	.38	.39	2.6	3.6	3.63	1.7

%Δ : Percentage of change between 1978 and 1983

Table 25

Changes in the price index of the consumption basket between 1978 and 1983 in selected fishing villages, Thailand

Province subdistrict village	Sample size	1978	1983	%Δ
CHUMPORN				
Paknam				
Village 2	3	162.63	208.82	28.4%
Village 3	2	67.46	79.35	17.62%
Village 4	8	158.45	148.71	-6.15%
Village 5	7	134.81	247.73	83.76%
Village 7	3	144.46	83.24	-42.38%
Natoong				
Village 3	14	126.26	192.36	52.35%
Village 4	7	135.03	178.78	32.40%
Total	64	135.92	179.62	32.15%
PANG NGA				
Panyee				
Village 1	5	77.91	143.47	84.15%
Village 2	26	170.31	207.56	21.87%
Village 3	17	79.14	164.65	108.05%
Bangtae				
Village 5	4	53.64	141.03	162.92%
Village 6	21	79.44	138.11	73.85%
Total	73	110.22	169.55	53.83%

%Δ : Percentage of change between 1978 and 1983

reduced by 10 percent in Chumporn and eight percent in Pang Nga; the ratio of working members to family size increased by 14 percent in Chumporn and by five percent in Pang Nga; women's participation in the labour force dropped by 10 percent in Chumporn and rose by three percent in Pang Nga; and, the level of education of working members rose by 15 percent in Chumporn but only by two percent in Pang Nga.

Having computed the proportional changes in total labour supply and its allocation between fishing and non-fishing activities and the proportional changes in the corresponding wage rates, we may attempt to compute preliminary estimates of the mobility coefficients 1/ using formulae (13) and (14) of Appendix A. Table 26 presents three alternative estimates: (a) unadjusted, (b) adjusted for changes in working members and (c) adjusted for inflation. The mobility coefficients turn out not to be very sensitive to these adjustments since they affect the 1983 magnitudes of wages and labour supply in both fishing and non-fishing activities.

The unadjusted mobility coefficients were computed to be 0.34 for fishing in Chumporn and 0.43 for Pang Nga, indicating that a 10 percent difference in the proportional changes in fishing and non-fishing wages, other things constant, would result in 3.4 percent change in labour supply to fishing in Chumporn and 4.3 percent change in labour supply in Pang Nga. The same differential would change non-fishing labour supply by 10.2 percent in Chumporn and 5.4 percent in Pang Nga.

Table 26

Preliminary estimates of mobility coefficients for fishing and non-fishing occupations in Chumporn and Pang Nga Provinces of Thailand[a]

	Unadjusted		Adjusted for working members wm		Adjusted for inflation and wm	
	F	NF	F	NF	F	NF
Mobility coefficients						
Chumporn	0.34	1.02	0.38	0.96	0.50	1.25
Pang Nga	0.43	0.54	0.44	0.52	0.56	0.63

a : based on 1978 and 1983 data for selected villages in Paknam and Natoong subdistricts of the Muang District of each Province.

F : fishing

NF: non-fishing

Source: Tables 17-25 and formulae (13)-(15) of Appendix A.

After adjustment for changes in working members and inflation, the mobility coefficients become 0.50 and 1.25 for fishing and non-fishing, respectively, in Chumporn, and 0.56 and 0.63 in Pang Nga. Regardless of which estimates are used, a number of tentative conclusions follows: (1) with the exception of non-fishing activities in Chumporn mobility is limited as indicated by mobility coefficients substantially below one; (2) mobility is generally more limited for fishing than for non-fishing; (3) Pang Nga households seem to be a bit more mobile in and out of fishing than households in Chumporn but the latter are substantially more mobile in and out of non-fishing activities; and (4) overall Chumporn households are more responsive to earnings differential and hence more mobile by our definition.

A hypothesis often put forward is that "entry into fishing is easier than exit". With respect to labour, at least, we found no such asymmetry: exit was found to be at least as easy as entry. This is not surprising since the household has basically three options:

1/ Our analytical framework (Appendix) provides also for the estimation of labour supply elasticities with respect to the wage rate and assets. This, however, is beyond the scope of the present study. For such estimation with a more limited sample see Panayotou, D. (1985).

continue fishing, take up more leisure, or switch to non-fishing activities. If fishing becomes less profitable without non-fishing becoming more attractive, the household may opt for more leisure although there are limits to how much labour supply can be reduced at near-subsistence levels of income. However, recall that mobility is defined as response to wage differentials; a fall in the fishing wage rate without a change in non-fishing wage rate would make non-fishing relatively more profitable including some exit from fishing and entry into non-fishing. As we have seen mobility into non-fishing occuations is relatively high; but the increase in non-fishing labour supply can have only two sources, fishing and leisure. But leisure is likely to increase because a fall in the fishing wage rate with unchanged non-fishing wage implies a fall in the household's average wage and hence a fall in the opportunity cost of leisure. Hence, all the increase in non-fishing labour supply (plus the increase in leisure) would have to come from a reduction in fishing labour supply. The same argument can be used to argue that in the case of a drop in the non-fishing wage relative to the fishing wage only a part of the released non-fishing labour would enter fishing, the rest would be absorbed into leisure. While the hypothesis of asymmetric mobility needs to be put to a statistical test, two propositions seem to be supported by our data. First, when mobility is interpreted as a complete change of occupation there is certainly some asymmetry between mobility in and mobility out depending on age: among young single males mobility into the fishery is certainly greater than mobility out; among people in their thirties (regardless of sex and marital status) mobility out of fishing is greater than mobility in; finally, among the veteran fishermen both mobility in and mobility out are quite limited (see Tables 15 and 16). Second, the mobility of capital out of the fishery seems to be more restricted than either mobility of capital into the fishery or mobility of labour out of the fishery (see Tables 17 and 19).

We may conclude our discussion of occupational mobility by highlighting our main finding: mobility into and out of the fishery is generally higher than commonly thought but it is limited in comparison to non-fishing activities and also in the sense that changes in labour supply to fishing are less than proportional to changes in earning differentials between fishing and non-fishing activities.

What factors may account for the less-than-perfect mobility? We have several hypotheses pertaining to non-economic features of the household, the community and the occupation (fishing). Religion, age of household head, sex and education of working members are household features that might have a bearing on mobility. Isolation, distance from town, the condition of roads and communication facilities are community features that may play some role. Higher risk, variability of returns, irregular working hours and sunk capital cost may also be factors limiting mobility. While our sample size and the lack of time series prevent the formal testing of all these hypotheses, a few are tested in the process of estimating the parameters of the labour allocation model.

5. GEOGRAPHICAL MOBILITY

The analysis of geographical mobility is inevitably more difficult and less rigorous than the analysis of occupational mobility unless one is prepared to follow the migrants to their destination. This is often prohibitively costly because of the migrants' dispersion throughout the country, and the limited information available at their place of origin. Non-economic factors are likely to play a more significant role in the change of residence than in the case of change in occupation. Moreover, mobility in space involves relocation (or, at least, transportation) costs, not to mention psychic costs. To complicate things, geographical mobility often involves radical occuapational changes.

As we were unable to follow the migrants to their destination, we limited ourselves to information which we could obtain from their place of origin, i.e., the fishing village. In the case of partial household out-migration we obtained information from the remaining members of the household. In the case of "wholesale" migration of the entire household, whether seasonal or permanent, we obtained information from relatives and the village headman. Of necessity, such information is rough and incomplete, and occasionally unreliable. In-migration presents less of a problem since the in-migrants were physically present in the village. Still, for in-migrants outside our sample frame we rely on the account given by the village headman.

This chapter is organized in three sections: (1) residential background and travel, (2) attitudes towards change of residence, and (3) in- and out-migration.

5.1 Residential background and travel

Based on the 1978 survey, 52 percent of the sampled household heads had been living in their current villages for over 30 years while 48 percent were in-migrants (Table 27). Thirty percent migrated in the preceding 20 years. In-migration seems to have accelerated in the period 1969-1978, during which 18 percent of household heads took residence in their current villages. In-migration was more important in Chumporn than in Pang Nga. In the former, almost half of the household heads were migrants compared to a quarter in Pang Nga. A quarter of the migrants in Chumporn arrived during the preceding 10 years.

Over half the in-migrants came from other villages in the same province. Another 16 percent came from Southern provinces other than their current province and 13 percent came from the Central region. West and East, which now belong to the Central region, contributed another 17 percent. The contribution of the North and the Northeast to migration to fishing villages was negligible. Again, there is a contrast between Chumporn and Pang Nga: over 60 percent of the migrants to Chumporn fishing villages came from outside Chumporn (44 percent from outside the Southern region) compared to Pang Nga where only 24 percent came from outside Pang Nga and virtually no one from outside the South (see Table 27). Isolation, distance and religion may explain the differential mobility between these two locations. Chumporn is centrally located on the main transport route from Bangkok to the South, at a distance of 498 km. The fishing communities of Pang Nga are located on rather remote islands in Pang Nga Bay at a distance of 901 km from Bangkok, and farther away from the other regions of the country. Moreover, being predominantly muslim, Pang Nga attracts migrants from the predominantly muslim provinces of the South neighbouring Pang Nga.

Travel is another indicator of actual and potential geographical mobility. According to Table 27, the majority (78 percent) of fishing household heads did some travel during 1978, mostly within the Southern region (65 percent) followed by the Central region including East and West (32 percent). Again, the limited geographical mobility of Pang Nga households was reflected in the least and shortest travel among all four provinces studied in 1978. Only 50 percent of fishing household heads in Pang Nga did any travelling and only 10 percent of this travel was outside the neighbouring provinces of the South. In contrast, 90 percent of household heads in Chumporn travelled throughout the Southern and Central regions. Most common modes of travel were bus (69 percent), boat (14 percent) and train (13 percent).

In the 1983 survey we enquired into the travel of all household members, not just the head. As seen in Table 28, 39 percent of the households sampled in Pang Nga had no member who travelled outside the immediate area of the village, compared to only 13 percent in the case of Chumporn. The percentage of households which had members travelling within their own province and to "other areas" was about the same, although in the case of Chumporn "other areas" included provinces throughout the South and the Central region while in the case of Pang Nga "other areas" included mainly provinces in the lower South neighbouring Pang Nga. It is also worth noting that only seven percent of the Pang Nga households had anyone travelling to Bangkok, compared to 25 percent in the case of Chumporn.

5.2 Willingness to change residence

Geographical mobility may also be defined as response to spatial income differentials. In the same way households and individuals change their occupation or their labour supply to particular occupation to take advantage of a higher wage and/or better working conditions, households and individuals may decide to move their residence to places with more attractive employment opportunities, provided the benefits exceed the costs of the move. To determine the potential geographical mobility of fishing households, a hypothetical offer of a well-paying away from home job was made to the household head. All transportation and relocation costs were to be paid by the government, while the net wage was substantially higher than their current earnings. Still, only 25 percent of the respondents expressed willingness to take up the offer. Surprisingly, but consistent with their earlier responses to hypothetical offers, the households in Pang Nga were a bit more enthusiastic (29 percent) about the offer than households elsewhere (see Table 29).

Table 27

Geographical mobility of fishing household heads in four coastal provinces, Thailand, 1978

	Chumporn		Nakhon[a]		Trat		Pang Nga		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
A. No. of years living in the village										
5	22	10.2	29	10.2	10	7.6	12	5.1	73	8.4
5-10	31	14.4	18	6.3	17	12.9	16	6.8	82	9.4
10-15	10	4.6	12	4.2	5	3.8	15	6.3	42	4.8
15-20	13	6.0	20	7.0	11	8.3	14	5.9	58	6.7
20-25	14	6.5	29	10.2	12	9.1	25	10.9	80	9.2
25-30	22	10.2	28	9.8	14	10.6	18	7.6	82	9.4
30	102	47.7	148	52.1	62	47.0	135	57.4	447	51.7
TOTAL	214	100.0	284	100.0	131	100.0	235	100.0	864	100.0
B. Place of previous residence for household head										
-Same province	35	39.3	65	52.4	27	55.1	44	75.8	171	53.4
-Eastern Region	2	2.2	6	4.8	16	32.6	-	-	24	7.5
-Central Region	11	12.3	26	20.9	4	8.1	-	-	41	12.8
-Westhern Region	26	29.2	5	4.0	-	-	-	-	31	9.6
-Southern Region	15	16.8	22	17.7	1	2.0	13	22.4	51	15.9
-Northern Region	-	-	-	-	-	-	-	-	-	-
-North-easthern Region	-	-	-	-	1	2.0	1	1.7	2	0.6
TOTAL	89	100.0	124	100.0	49	100.0	58	100.0	320	100.0
C. Farthest travel in 1978										
-Easthern Region	8	4.1	1	0.4	54	53.4	1	0.5	64	9.4
-Central Region	56	29.1	50	24.5	19	18.8	12	6.7	137	20.3
-Westhern Region	12	6.2	4	1.9	-	-	-	-	16	2.3
-Southern Region	113	58.8	114	70.5	23	22.7	160	90.3	440	65.2
-Northern Region	2	1.0	1	0.4	2	1.9	1	0.5	6	0.8
-North-easthern Region	1	0.5	2	0.9	1	0.9	-	-	4	0.5
-Other (Penang, Burma)	-	-	2	0.9	2	1.9	3	1.6	7	1.0
TOTAL	192	100.0	204	100.0	101	100.0	117	100.0	674	100.0
D. Mode of travel										
-Boat	24	13.4	26	13.5	18	16.9	24	14.1	92	14.2
-Bus	133	74.2	92	47.9	87	82.0	135	79.4	447	69.0
-Boat and bus	-	-	12	6.2	-	-	11	6.4	23	3.5
-Train	22	12.2	62	32.2	1	0.9	-	-	85	13.1
TOTAL	179	100.0	192	100.0	106	100.0	170	100.0	647	100.0

[a] Nakhon Sri Thammarat

Table 28

Geographical mobility (travel) during 1983 by village and place of visit

(percent)[a]

Province/ subdistrict/ village	Sample size	No travel	Travel within own province[b]	Travel to Bangkok	Travel to other areas[c]
CHUMPORN					
Paknam					
Village 2	6	-	17	-	89
Village 3	5	-	40	-	60
Village 4	13	-	15	31	31
Village 5	11	23	18	27	45
Village 7	3	9	-	67	33
Natoong					
Village 3	18	11	33	28	22
Village 4	8	50	25	25	-
Total	64	13	21	25	40
PANG NGA					
Panyee					
Village 1	6	17	33	-	50
Village 2	28	25	29	11	36
Village 3	21	38	24	5	33
Bangtae					
Village 5	6	67	17	17	-
Village 6	26	46	12	4	38
Total	87	39	23	7	31

[a] Percent of sampled households having at least one member who travelled to the indicated places.

[b] In the case of Pang Nga includes the neighboring province of Phuket Island.

[c] In the case of Chumporn "other" includes (in order of importance) the Southern provinces of Ranong, Prachuab Khirikan, Surat Thani, Pang Nga, Trang, Songkhla, Phuket and the Central provinces of Chainat, Chachoengsao, Chantaburi and Rayong. In the case of Pang Nga "other" includes Krabi, Ranong, Nakhon Sri Thammarat, Songkhla, Pattani, Chumporn, Yala, Surat Thani and Narathiwat all in the South; some also visited Padang Besar in North Peninsular Malaysia, and one person went overseas.

Table 29

Willingness to change residence, given appropriate occupation, among fishing household heads in four coastal provinces, Thailand, 1978

	Chumporn		Nakhon[a]		Trat		Pang Nga		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
A. Willingness to change residence if a well-paying job was offered elsewhere.										
- Yes	43	20.3	85	29.5	21	16.0	70	28.9	219	25.1
- No	168	79.6	203	70.4	110	83.9	172	71.0	653	74.8
TOTAL	211	100.0	288	100.0	131	100.0	242	100.0	872	100.0
B. Knowledge of average wage rate for unskilled workers in town.										
- Yes	67	30.8	172	59.5	63	45.9	150	61.7	452	50.9
- No	150	69.1	117	40.4	74	54.0	93	38.2	434	48.9
TOTAL	217	100.0	289	100.0	137	100.0	243	100.0	886	100.0
C. Willingness to move to town for employment residence										
- Yes	14	6.5	57	20.1	1	0.7	26	11.3	98	11.4
- No	201	93.4	226	79.8	131	99.2	203	88.6	761	88.5
TOTAL	215	100.0	283	100.0	132	100.0	229	100.0	859	100.0
D. Willingness to change residence if land was given away from home										
- Moving	79	36.4	167	58.5	40	29.6	107	44.2	393	44.6
- Not moving	80	36.8	79	27.7	66	48.8	73	30.1	298	33.8
- Uncertain	58	26.7	39	13.6	29	21.4	62	25.6	188	21.5
TOTAL	217	100.0	285	100.0	135	100.0	242	100.0	879	100.0
E. Reasons for not moving										
- Prefer the old area	14	17.5	22	27.8	39	59.0	18	24.6	93	31.2
- Old age	7	8.7	4	5.0	4	6.0	19	26.0	34	11.4
- Far from relatives	1	1.2	3	3.7	1	1.5	3	4.1	8	2.6
- Lack of confidence in the new area	44	55.0	15	18.9	10	15.1	20	27.3	89	29.8
- Prefer fishing	6	7.5	10	12.6	12	18.1	3	4.1	31	10.4
- No experience in other occupation	1	1.2	11	13.9	-	-	3	4.1	15	5.0
- Other (risk, fear of land work etc.)	7	8.7	14	17.7	-	-	7	9.5	28	9.3
TOTAL	80	100.0	79	100.0	66	100.0	73	100.0	289	100.0

[a] Nakhon Sri Thammarat

While about one half of the sampled households had a good idea of what the average wage rate for unskilled workers in the town was, only 11 percent were willing to move to town for employment and residence even at a higher wage rate. In contrast, 45 percent said they were willing to change their place of residence if farmland was given to them away from home, 34 percent said they were not moving and 21 percent were uncertain. The most common reasons given by the households who were unwilling to move were: preference for the old area (31 percent), lack of confidence in the new area (30 percent), old age (11 percent), attachment to fishing (10 percent) and reservations about land-based occupations (9 percent). Rather surprisingly, distance from relatives did not feature as an important reason for not moving except for eight out of some 300 households (see Table 29).

Four conclusions may be drawn from this section: (a) fishing households are generally unwilling to change residence for purely economic reasons; (b) although most households have knowledge of the going urban wage rate, very few are willing to take up residence in town even if they can earn more than in the village; (c) one incentive which might induce substantial geographical mobility is provision of land away from home; and (d) geographical immobility has less to do with attachment to fishing and more with attachment to a particular area and distrust of other areas.

5.3 Migration into and out of fishing communities

In this section we discuss two types of information: (1) community-wide migration of households and persons based on information obtained from the village headman and (2) migration of individual members of sampled households based on information given by their families and relatives. While there may be some overlaps, the first information is more of a macro or a general-trend nature while the latter refers to specific persons.

To appreciate the first type of migration we present, first, some mobility-related features of the communities we have been studying. As reported in Table 30, the typical fishing community in the sample is at a distance of 30-40 km or a 60-90 minutes drive from the provincial capital under good weather conditions. It is usually accessible by a small bus and/or boat which run once or twice a day; the condition of roads range from fair to good. The population of each village is close to a 1,000 people or 150 households; 60 to 80 percent of them are engaged in fishing, the rest in farming, retail trade, carpentry and hired labour. Land is extremely limited, less than half a hectare per family.

Virtually all communities have experienced some in-migration between 1978 and 1983 mainly from neighbouring districts and other Southern provinces such as Pattani, Phet Buri, Phuket and Krabi. The numbers vary but are generally small in comparison with the total village population. Most in-migrants were previously engaged in fishing, rice farming or hired labour and came to the community as a result of marriage or employment. They mainly work as hired labour in fishing, and in rubber and coconut plantations; few do their own fishing or farming (see Table 31).

Out-migration was more sizeable but less permanent. A village may have had 20 and sometimes 30-50 out-migrants who left fishing and farming in their communities to seek higher incomes in other provinces as hired fishing labourers. The most popular destinations were the Southern provinces of Ranong, Pattani and Songkhla. The headman of Paknam subdistrict in Chumporn, which includes five of the 12 villages in our sample, stated that 10 percent of Paknam population migrates seasonally to Phuket, Pang Nga and Satun to earn higher income working as hired fishing labourers (see Table 32). On the other hand, our attention was called to "wandering" groups of Northeastern youths searching for seasonal employment on the medium-to-large-scale fishing boats in the Paknam port.

Another interesting form of seasonal migration referred to in every Chumporn village we visited was the seasonal transfer of fishing boats on trucks across the peninsula from Chumporn in the Gulf of Thailand to Ranong on the Andaman Sea. This 3-4 months migration is stimulated not only by seasonal weather patterns but also by the richness of Ranong's fishing grounds which border the underfished waters of Burma.

Out-migration from Pang Nga was more limited both in numbers and distance; it involved no occupational change and was associated more with special circumstances such as marriage and return to previous residence than to purely economic incentives. However,

Table 30

Mobility-related characteristics of selected fishing villages in Chumporn and Pang Nga Provinces of Thailand, 1983

Province, subdistrict and village	Distance of village from provincial capital (km)	Travelling time to provincial capital (minutes)	Mode of transport available	Condition of roads/ accessibility	Area	Population	Number of house-holds	Fishing households as a % of the total	Households in second most impor-tant occupa-tion as % of total
CP/PS[a]									
Village 3	15	20	bus	good	1,000 rai	12,904	2,116	60%	20% (farmers)
Village 5	20	30	bus	good	1,000 rai	-	118	60%	20% (farmers)
Village 7	30	90	small bus and boat	poor	very limited	-	-	80%	-
CP/NS[a]									
Village 3	16	60	small bus (twice a day)	poor	1,992 rai	970	180	-	20% (merchants, carpenters and labourers)
PP/PS[a]									
Village 2	47	45	small bus and boat	fair	20 rai	1,100	200	80%	20% (merchants)
Village 3	30	60	small bus and boat	poor	150 rai	820	118	80%	-
PP/BS[a]									
Village 5	40	90	small bus (twice a day)	good	5,000 rai	700	127	20%	50% (farmers)
Village 6	56	90	small bus (three times a day)	good	5,000 rai	870	98	70%	30% (farmers)

- Information not available

[a] Notation: CP/PS = Chumporn Province/Paknam Subdistrict; CP/NS = Chumporn Province/Natoong Subdistrict; PP/PS = Pang Nga Province/Panyee Subdistrict; PP/BS = Pang Nga Province/Bangtae Subdistrict

Table 31

In-migration between 1978 and 1983, selected fishing villages in Chumporn and Pang Nga, Thailand

Village	In-migrants during the last five years		Origin of migrants	Previous occupation of migrants	Reasons for migrating	New occupation
	No. of families	No. of persons				
CP/PS[a]	40-50	-	- Phet Buri[b] - Northeast[c]	- fish and rice farming	- to find employment	- hired fishing labour
Village 3	-	-	- Pang Nga[b]	- hired labour	- unable to build new boat	-
Village 5	3-4	-	-	- rice farming	- to earn more income	- coconut farming
CP/NS[a]						
Village 3	-	20	- Pattani[b]	-	-	- hired fishing labour
PP/PS[a]						
Village 2		4-5	- Phuket[b] - Krabi[b]	- fishing	-	- fishing
Village 3	4-5	20	- A. Tubput[d]	-	- to marry - to work	-
PP/BS[a]						
Village 5	-	10	- Krabi[b] - A.Takhutong[d]	-	- to marry - convenience of work	- rubber farming
Village 6	1	4	- A. Tubput[d]	- fishing	- earn more income	- fishing

- information not available

[a] CP/PS = Chumporn Province/Paknam Subdistrict; CP/NS = Chumporn Province/Natoong Subdistrict; PP/PS = Pang Nga Province/Panyee Subdistrict; PP/BS = Pang Nga Province, Bangtae Subdistrict.

[b] Neighbouring provinces

[c] Northeast Thailand

[d] Neighbouring districts

Table 32

Out-migration between 1978 and 1983, selected fishing villages in Chumporn, Thailand

Village	Out-migrants: Families	Out-migrants: Persons	Occupation before migration	Land ownership	Land use	Reasons for out-migration	Destination of out-migrants	New occupation
CP/PS[a]	-	about 1000 or 10% of total population (temporary)	-	-	-	- to earn more income	- Phuket, - Pang Nga, - Satun	90% - hired fishing labour
Village 3	-	50 (temporary)	fishing	yes	- rice farming - coconut farming	- convenience	- 70-80% to their old province - 20-30% to other provinces (Ranong, Trang)	- fishing
Village 4[b]	-	20 (temporary)	fishing	yes	- coconut farming	- to earn more income	- Pattani, - Song Khla - Ranong - Trang	- hired fishing labour
Village 5	20 (permanent)	20 (temporary)	-	-	-	-	- Pattani, - Song Khla	- hired fishing labour
Village 7	-	20 (temporary)	-	-	-	-	- Pattani - Song Khla	- hired fishing labour
CP/NS[a]								
Village 3	-	2-3	-	yes		- to earn more income	- Saudi Arabia	- hired fishing labour
		30-40	-			- monsoon	- Ranong	

- information not available

[a] CP/PS = Chumporn Province/Paknam Subdistrict; CP/NS = Chumporn Province/Natoong Subdistrict

[b] Also 30 persons change occupation from hired fishing labour to carpentry and farming.

Table 33

Out-migration between 1978 and 1983, selected fishing villages in Pang Nga, Thailand

Village	Out-migrants		Occupation before migration	Land ownership	Land use	Reasons for out-migration	Destination of out-migrants	New occupation
	Families	Persons						
CP/PS[a]								
Village 2[c]	-	- number varies (temporary migration 3-4 month/ year)	- fishing	-	-	- marriage - richer fishing ground	- Krabi, Phuket - Ranong	- fishing
Village 3	3	10	- merchants	yes	-	- transportation not convenient	- Mo Dang subdistrict	- selling fish
Village 5	3 (permanent)	- number varies (temporary)	- rice farming - coconut farming - hired labour	-	- rice and coconut farming	- return to place of previous residence - to work	- Bo Sang subdistrict	- coconut farming - hired labour (mangrove felling)

- information not available

[a] CP/PS = Pang Nga Province/Panyee Subdistrict

[c] Several fishermen changed occupation from fishing to mariculture earning an average income of 20,000-30,000 baht per year

Table 34

Destination, occupation and income of out-migrants in selected villages in Chumporn Province in Thailand recorded in 1983

	No. of households with out-migration	No. of persons per village	Average years in village	Destination	Current occupation	Current income (baht/mo)	Reason for migrating if not economic
Paknam							
Village 2	4	7	15	-Chumporn (2) (town) -Chumporn (3) (Paknam) -Bangkok (2)	- - -	- - -	-Widow (2) -Marriage (1) -Divorce (1) -Study (2) -Live with son(1)
Village 3	2	2	12	-Bangkok (1) -Samut Sakorn(1)	-Student (1) -	- -	-Study (1) -Marriage (1)
Village 4	1	2	12	-Suphanburi (1) -Bangkok (1)	-Househelper(1) -Student (1)	- -	-Marriage (1) -Study (1)
Village 5	4	8	26	-Chumporn (2) (Muang District) -Chumporn (1) (Paknam) -Other Province (1) -Petchburi (1) -Bangkok (2) -Loei (1)	-Rice farming(2) -Fishing (1) -Merchant -Hired labor(1) -Restaurant work (2) -Tailor (1)	1,000(2) 800(1) 2,000(1) 3,000(1) 1,000(2) 2,200 (1)	-Marriage (6) -Work (2)
Natoong							
Village 3	3	4	16	-Pattani (1) -Krabi (1) -Chumporn (2) (Pratil District)	-Teacher (2) -Fishing (1)	3,200(1) 2,000(1) 10,000(1)	-Marriage (2) -Government job(1)
Village 4	1	1	23	-Chumporn (Ta Yang Sub-district)	-	-	-Marriage (1)

( ) number of persons; - information not available.

Table 35

Destination, occupation and income of out-migrants in selected villages in Pang Nga Province, Thailand recorded in 1983

Subdistrict and village	No. of households with out-migration	No. of persons per village	Average years in the village	Destination	Current occupation	Current income (baht/month)	Reasons for migrating if not economic
Panyee							
Village 2	3	7	34.3	-Pang Nga (Thupput) (4)	-Fishing (2)	-	-Study (2)
				-Phuket (1)	-	-	-Married (1)
				-Pang Nga (Kho Them)	-Mining (2)	-	-Married (2)
Village 3	1	1	30	-Bangkok (1)	-Hired labor(1)	-2000 (1)	-Married (1)
Bangtae							
Village 5	2	2	21.5	-Pang Nga (Village 6) (1)	-Fishing (1)	-1000 (1)	-Stay with mother (1)
				- (1)			
Village 6	6	6	26.8	-Krabi (1)	-Rubber farming (2)	-	-Stay with grand-mother (1)
				- (5)			-Married (5)

( ) Number of persons
- Information not available

Table 36

Origin, occupation and income of in-migrants in selected villages in Chumporn Province, Thailand, recorded in 1983

Subdistrict and village	No. of house-holds with in-migration	No. of persons per village	Average years in the village	Origin	Current occupation	Current income (baht/mo)	Reasons for migrating
Paknam							
Village 2	1	1	10	-Rayong (1)	-	-	-Return home (1)
Village 4	1	2	2.5	-Prachuap Khiri Khan(1) (Hua-Hin) -Chumporn (1) (Tayang)	-Fishing (2)	1200 (2)	-Married (2)

Table 37

Origin, occupation and income of in-migrants in selected villages in Pang Nga Province, Thailand, recorded in 1983

Subdistrict and village	No. of house-holds with in-migration	No. of persons per village	Average years in the village	Origin	Current occupation	Current income (baht/mo)	Reasons for migrating
Panyee							
Village 1	2	2	0.72	-Pang Nga (1) (Thai Muang) -Pang Nga (1) (town)	-Charcoal maker (1) -Housewife (1) -Hired labor (1)	3000 (1) 1750 (1)	-Higher income(2) -Marry (1)
Village 2	2	2	2	-Krabi (2)	-Merchant (1) -Unknown (2)	500 (1)	-Trade (1) -Marry (1) -Divorce (1)
Village 3	1	1	4	-Nakhon Sri Thammarat(1)	-Fishing (1)	2000 (1)	-Marry (1)

in one village (2) there was a variable number of fishermen who migrated during four months of the year to the neighbouring provinces of Krabi, Phuket and Ranong in search of richer fishing grounds. In the same village, it was reported, several fishermen have changed occupation from fishing to mariculture (with FAO/Thai Government assistance) and they were now earning an average income of 20,000-30,000 baht per year (see Table 33).

We, now, turn to migration from households within our sample. Of 64 households sampled in Chumporn 15 (or 23 percent) have experienced out-migration between 1978 and 1983 involving a total of 22 persons (see Table 34). Out-migrants had been living for 12-26 years in the village before they migrated to places as near as other villages in their own subdistrict and as far as Loei Province in the Northeastern Region of the country. However, the most popular destinations were other villages and towns in Chumporn and Bangkok. In their new place of residence migrants took up occupations ranging from house-help to tailoring and from teaching to working in restaurants; others continued their old occupations such as fishing, rice farming and retail trade. Incomes ranged between 800 and 10,000 baht. For the majority earning less than 1,500 baht (the minimum wage) there was hardly any improvement in their economic status resulting from out-migration; but, as their families explained, marriage rather than higher income was the main reason of their out-migration. It is also worth noting that a number left the fishing villages for study in the local town or Bangkok.

Out-migration from Pang Nga was more limited than from Chumporn affecting only 14 percentof the sampled households and involving only 16 persons. Out-migrants were long-time residents of the village who left for neighbouring districts and provinces primarily for social reasons such as marriage or to stay with relatives (see Table 35).

In-migration into the sampled households can take two forms: (a) return of pre-1978 out-migrants; and (b) marriage with outsiders who then come to reside in the village. Among the sampled 64 Chumporn households only two experienced in-migration involving three persons, one returning home and two outsiders marrying into the village. The latter took up fishing and earned about 1,200 baht/month (Table 36).

In Pang Nga five households out of the 87 sampled have in-migration involving five persons originating in other towns in Pang Nga and other Southern provinces. Marriage, divorce and "return for business" were the motivation given. In-migrants took up a variety of jobs such as fishing, hired labour, retail trade and charcoal making, earning incomes between 500 and 3,000 baht per month (Table 37).

In conclusion, migration in and out of fishing communities, while not uncommon, is limited in numbers and takes place more in response to social than economic incentives. Out-migration is more significant, less permanent and more responsive to economic incentives than in-migration. It takes the form of seasonal migration to areas of better economic opportunity, such as richer fishing grounds or better-paying fishing labour jobs, mainly in other Southern provinces. In-migration is less important in numbers and often the result of marriage but it does contribute to geographical mobility by promoting travel and information transfer between the place of origin and the place of residence.

6. SUMMARY AND POLICY IMPLICATIONS

This study was initiated against the background of two rather extreme positions. On the one hand, the open-access theory assumes perfect factor mobility in and out of fishing. On the other, it is often argued that fishermen, especially those of smaller scale, are occupationally and geographically immobile for a variety of reasons which include: attachment to fishing as a way of life, gambling behavior, sociocultural constraints, sunk capital costs, low education, ignorance of alternative opportunities, unresponsiveness to economic incentives, etc.

Using the result of two rather extensive surveys taken five years apart in a number of Thai fishing villages and employing different methods of analysis, we arrived at the conclusion that, for Thailand at least, both extremes are unwarranted by evidence. Fishermen are responsive to economic incentives and do move between occupations and locations to take advantages of earning differentials. Yet, this mobility is far from perfect.

Labour is quite mobile between occupations but less so between locations. Capital tends to be less mobile than labour, at least in the short run. Fishermen do not admit to having emotional attachment to fishing but there are certain features of fishing they would like to retain in any new occupation: the freedom and independence of being one's own boss. For this reason they reject wage employment in factories but they are prepared to take up crop or fish farming if they were given land or other assistance.

Fishermen, however, do admit that they feel attachment to their area of residence and they distrust unknown far-away places. Given a choice, they prefer to move to other rural areas than to the big city. This is especially true of fishermen in more isolated fishing communities such as those of Pang Nga. Both religion and distance appear to constrain geographical mobility. Muslim fishermen and their families travel less than Buddhists and, when they do, they visit other neighbouring muslim provinces. Both travel and migration centres around the home province and thins out as one moves away from home; distant locations fare less frequently as origins or destinations of migration and travel.

A few more findings are worth summarizing here. Mobility in and out of fishing, though considerable, is lower than mobility in and out of non-fishing occupations. Mobility of labour out of fishing is, if anything, greater than mobility into fishing, but the case with capital may be different. Fishing appears to be losing ground as an occupation, while the population of fishing communities stabilises as a result of (a) the drying up of the permanent in-migration of the sixties and the seventies, and (b) the reduction in population growth. Out-migration is temporary and usually in response to economic incentives, especially in fishing activities elsewhere; in-migration, on the other hand, is more permanent but less significant and it is socially rather than economically induced.

In one of our study sites, Chumporn, occupational mobility seems to have worked quite well in narrowing the gap between the fishing and non-fishing wage rate from 33 baht to 2 baht but it failed to do so in Pang Nga where the gap has widened from 4 baht to 50 baht. However, Pang Nga appears to be in temporary disequilibrium as a result of the recent decline in non-fishing activities especially offshore tin mining. It can be said that under the present economic and resource parameters all resource rents in Chumporn have been dissipated. In Pang Nga there exist temporary rents created partly by a recovery of the fishery and partly by the fall in the opportunity cost of labour following the decline in non-fishing activities.

What are the policy implications if any? At first thought, one is tempted to propose policies to enhance mobility into fishing in Pang Nga, and perhaps to retard mobility out of fishing in Chumporn. This could appear to be beneficial to the fishermen in the light of the higher (still high) incomes to be earned from fishing in Pang Nga (Chumporn). Yet such policies are unlikely to be beneficial in the long run either to the society or to the fishermen themselves. Fishermen would be locked back into a sector from which they find it painful to exit when conditions deteriorate, while society would miss the opportunity to manage the resource without the need to force people out of the fishery. The latter is possible since in Chumporn there is already voluntary exit, while in Pang Nga a change of circumstances has brought the fishery closer to the economic optimum level of effort. The challenge for the government is to consolidate the current situation in Pang Nga and support the trend in Chumporn and at the same time to improve income levels especially in Pang Nga. To accomplish this it would be necessary to promote more non-fishing alternatives in the areas where fishermen live since geographical mobility, especially in Pang Nga, is rather limited. The present study provides ample information on the attitudes of fishermen towards different occupations, and suggests the potential for some new activities such as fish farming and cottage industry.

However, promotion of alternative employment does not necessarily mean creation of new activities. Fishermen are already engaged in a variety of non-fishing activities and they are quite responsive to differential earnings between these and fishing. What is needed is support for the very activities which have been neglected in the past because of a bias towards fisheries development. Such support may include infrastructure, credit and dissemination of information on employment opportunities and new technologies and markets. In the long run, geographical mobility should be encouraged especially out of

the isolated communities of Pang Nga but not towards Bangkok or other large urban centres. But, to forestall an influx of new entrants into the fishery as rents are created, it would be necessary to accompany the promotion of non-fishing alternatives with effective controls on entry, perhaps through the granting to the small-scale fishing communities of exclusive territorial use rights to the coastal fishery1/.

7. BIBLIOGRAPHY

Chareonwongsak, K., 1982 Migration and agriculture household labour supply allocation. Kasetsart University, Faculty of Economics. (Unpubl.)

Chindasaeng, S., 1979 Migration into Bangkok Metropolis and its impact on employment, 1974-1977". M.A. Thesis, Bangkok, Faculty of Economics, Thammasat University. (Unpubl.)

Christy, F.T. Jr., 1982 Territorial use rights in marine fisheries: definitions and conditions. FAO Fish.Tech.Pap., (227):10 p. Issued also in French and Spanish

Panayotou, D., 1985 Labor supply in the Thai fisheries. M.A. Dissertation. Bangkok, Faculty of Economics, Thammasat University

Panayotou, T., 1982 Management concepts for small-scale fisheries: economic and social concepts. FAO Fish.Tech.Pap., (228):53 p. Issued also in French and Spanish

Panayotou, T. et al., 1982 Socioeconomic conditions of coastal fishermen in Thailand: a cross-section profile. In Village level modernization in Southeast Asia: the political economy of rice and water, edited by G.B. Hainsworth. Vancouver, University of British Columbia Press, pp.301-34.

1/ For more details on fisheries management and the concept of territorial use rights in fisheries (TURFs), see Panayotou (1982) and Christy (1982).

APPENDIX A

A MODEL OF LABOUR SUPPLY AND ALLOCATION

Labour mobility is basically a labour supply allocation problem. An individual or a household, possessing a certain endowment of time and other assets, having particular preferences between income and leisure and facing a number of employment options, determines how much labour or time (and other resources) to allocate to these different activities. For example, an individual decision-maker, say a "fisherman", may decide to allocate his time between fishing, farming and leisure. He may fish in the morning and farm in the afternoon or he may fish part of the year and farm during the rest of the year. The important parameters which enter his decision are the expected income from each occupation (which is partly determined by his skills), his preferences between the different occupations, and the total time and other assets available to him. A collective decision-maker such as a household must consider alternatives facing all household members, their skills and preferences and the overall labour resource of the household. The "optimal" mix of activities would naturally be wider in the case of a collective decision-maker than a single individual. The social structure of Thailand is such that labour allocation (and other) decisions are made collectively by the household rather than individually by each household member[1/].

For analytical convenience, we may split the problem of household labour allocation between different activities into two stages, assuming separability between them. In the first stage, the household decides on the optimum allocation of the total time endowment of its members between work and leisure. In the second stage, the optimum amount of labour to be supplied by the household, as determined in the first stage, is allocated among the various employment options facing the household

The consumption - leisure choice

The total labour supplied by the household is derived from the household's consumption-leisure choice. Consumption is made possible only through one's own production which requires work (sacrifice of leisure), or through purchase on the market which requires cash income and which, in turn, requires work (unless the household has sufficient non-labour income to purchase its desired consumption basket). The larger the consumption basket desired, the more the working hours needed to acquire it and, therefore, the less leisure available to household members. The household makes its choice between consumption and leisure (and hence between work and leisure) so as to maximize the household's total utility subject to a budget constraint defined by the household's endowment in time and assets (non-labour income), the cost of the consumption basket, and the return from work (wage rate) which is also the opportunity cost of leisure.

The optimal supply of labour, L^*, by the household may be written as a function of the wage rate, W, the price of the consumption basket, P, and the household assets, A, as follows:[2/]

$$L^* = L^*(W;\ P,\ A) \qquad (1)$$

Equation one may be rewritten in real terms as:

$$L^* = L^{*\prime}(W';\ A') \qquad (2)$$

where $W' = W/P$ and $A' = A/P$

The optimal demand for leisure, Z^*, is then obtained as a residual,

$$Z^* = T - L^* \qquad (3)$$

where T is the household's total time endowment (say 24 hours per day per person).

1/ Chareonwongsak (1982), p.11

2/ For the derivation see Panayotou, D. (1984) and Chareonwongsak (1982)

Equation (2) gives the relationship between the real wage rate and the labour supply (the shape of the labour supply curve). The non-labour income or assets determine the position of the supply curve. The shape of the supply curve is determined by the net result of the substitution and income effect as shown in Figure 1. At relatively low wages, wage increases tend to increase the labour supplied by the household since the substitution (of consumption goods and hence work for leisure) effect outweighs the income effect. At relatively high wages the reverse occurs as the income effect may outweigh the substitution effect (backward bending supply curve of labour).

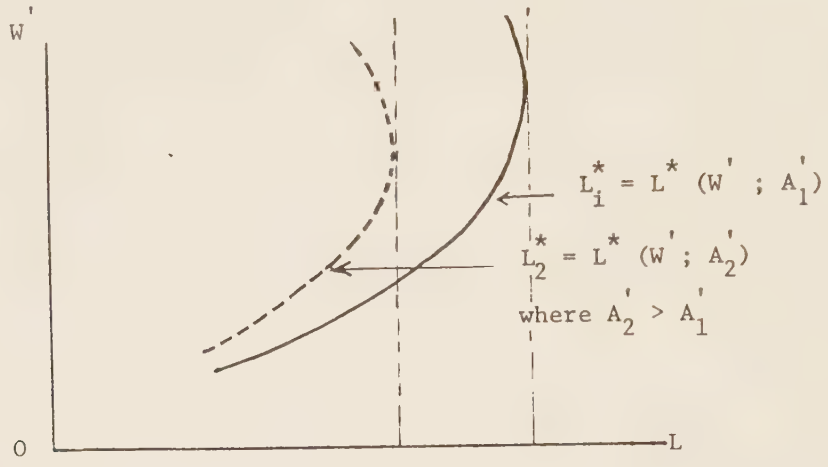


Fig. 1: Backward bending labour supply curve

The optimum labour supply equation (2) may be approximated[1/] by:

$$\ell^* = \varepsilon_w w + \varepsilon_a a \qquad (4)$$

where ℓ^* is the proportional change in labour supply between two points in time and w and a are, respectively, the proportional changes in the real wage and real assets between the same two points in time, while ε_w and ε_a are the labour supply elasticities with respect to the wage rate and assets (or non-labour income) respectively (that is, they indicate the percentage charge in labour supply resulting from a one percent change in the wage rate and assets, respectively).

Thus, equation (4) expresses the proportional changes in labour supply as a function of the proportional changes in the wage rate, and non-labour income weighted by the corresponding supply elasticities.

The labour supply allocation

Having determined the optimum supply of labour by the household, ℓ^*, to all activities taken together, there remains the task of allocating this labour supply among various possible activities available to the household. A fishing household faces the following basic employment options:

a) fishing employment within the community of residence; no transportation and/or retraining required (involves no mobility).

1/ For derivation see Panayotou, D. (1985)

b) fishing employment in other communities in the vicinity of residence; transportation required but no retraining (geographical mobility);

c) non-fishing employment in the community such as farming, small business and wage labour; some retraining may be required but no transportation (occupational mobility);

d) non-fishing employment in the vicinity of the community; both transportation and retraining may be required (both geographical and occupational mobility);

e) fishing employment elsewhere requiring permanent relocation (migration);

f) non-fishing employment elsewhere requiring permanent relocation (migration and occupational mobility).

These options may be presented in the following matrix form:

	Community	Vicinity	Distant Area
Fishing	X	Transportation	Information Relocation
Non-fishing	Retraining	Transportation Retraining	Information Relocation Retraining

The second column is basically a compromise or an intermediate possibility between the first and third columns, that is, it enables the allocation of labour to activities outside the community while maintaining a residence within the community. We can, therefore, reduce the number of basic options to four according to whether they require relocation and retraining:

	Community	Distant Area
Fishing	X	Relocation
Non-fishing	Retraining	Relocation Retraining

Vicinity is reduced to "community" by deducting transportation costs from the earnings from employment in the vicinity. There is some value, however, in retaining the intermediate classification in that it allows continuity from "community" to "distant area"; when transportation costs increase, other things constant, migration becomes relatively more attractive.

Both fishing and non-fishing are composite activities. Fishing consists of: (a) operating one's own boat, (b) working as hired crew member, (c) engaging in fish processing at home, and (d) fish marketing. Non-fishing consists of farming, trades, small business, unskilled labour, etc. The level of disaggregation depends on the degree of detail desired. As a first step, we will work in terms of the two basic groups of activities, fishing and non-fishing.

The household, then, allocates its overall labour supply, L^*, between different activities so as to maximize the total net household income, or wage bill. The important parameters in this allocation are the relative wage rates, that is, the market rate at which one activity is transformed into another, and the rates at which the household <u>can</u> transform one activity into another which depends largely on skills.

The optimum allocation of L^* between two occupations, say fishing, L_1, and non-fishing, L_2, is given by the following decision rule[1/]:

$$\frac{W_1}{W_2} = RLT \qquad (5)$$

where W_1 is the fishing wage rate and W_2 the non-fishing wage rate.

1/ For derivation see Panayotou, D. (1985)

Equation (5) says that the household maximizes its income by equating the fixed wage ratio (that is, the rate at which the two activities are exchanged in the market) to the household's rate of labour transformation, RLT, (that is, the rate at which the household, given its skill mix and sex and age structure, is able to convert fishing labour into hours of non-fishing labour and vice versa). This result can be presented diagrammatically as in Figure 2, assuming that RLT increases as we move from left to right along the labour transformation curve[1/], i.e., as more L_2 and less L_1 are supplied from a fixed total supply, L, an increasing amount of L_1 must be sacrificed per unit of L2.

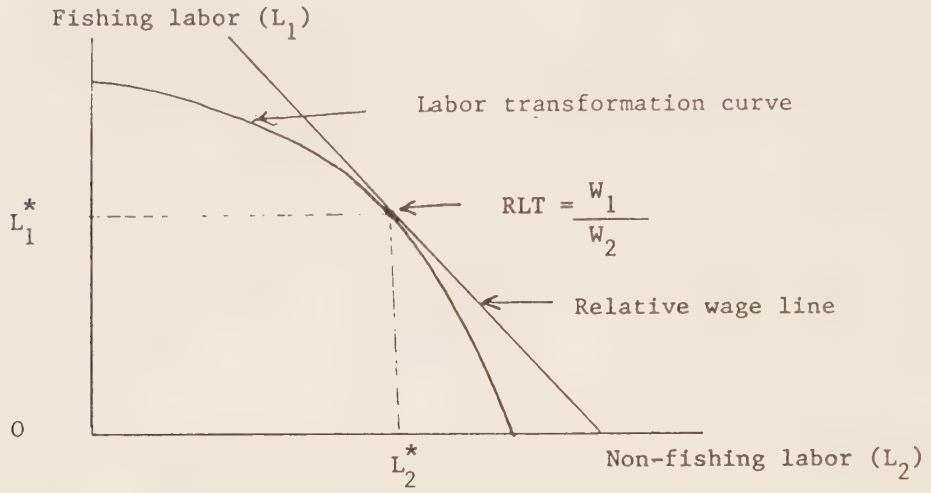


Fig. 2: Labour supply allocation between fishing and non-fishing activities

The labour transformation function

The labour transformation function (or curve) depicts the various combinations of labour supply by a household to different employment activities possible with a fixed amount of total labour time. If there was perfect substitutability of labour between different occupations, the transformation curve would have been a straight line and the total amount of labour would have been allocated to the activity with the higher wage rate; or if all activities paid the same wage rate the household would have been indifferent between the different activities and therefore the supply to each would have been indeterminate. If, on the other hand, there was zero substitutability between different activities, there would have been a fixed labour supply to each activity independently of relative wage rates.

The intermediate case of some but not perfect substitutability is the most realistic one. A household with members of different sex, age, education, experience and other characteristics is likely to be able to produce a certain combination of activities more efficiently (in the technical sense) than any single activity. Some household members are more skillful in fishing and others in farming or non-farming occupations. Were the household to allocate all its labour supply to fishing, fewer effective hours of work would be produced than if a mix of activities was chosen to fit the socio-demographic and skill characteristics of the household members. For instance, the husband may spend most of his working time in fishing, the wife in home industry (including fish processing) and children in tending animals.

Of course, the exact combination of activities would be determined as we have seen both by the ease with which the household converts labour from one activity into the other and the relative wages of the two activities. There is a wage structure which will induce a household member to spend more of his working time on his second or third best activity, if his lower productivity or lower preference is compensated by a higher wage. The important point here is that, as the household increases its labour allocation to

1/ For a discussion of the shape of the transformation curve see next section

activity B at the expense of activity A, more and more hours from activity A need to be sacrificed to produce an additional hour of activity B. Therefore, the labour transformation curve would not be a straight line but concave to the origin as in Figure 2, and its functional specification must reflect this feature, as well as the differential substitutability between activities.

Optimal labour supply to individual activities

It can now be shown that the proportional change in the labour supplied to activity i, ℓ^*_i, equals the proportional change in the total labour supplied by the household, ℓ^*, plus or minus the difference between the proportional change in the wage rate from activity i, w_i, and the proportional change in the wage from alternative activities facing the household, w_j, adjusted by the transformation factor, β_i, which expresses the ease or difficulty with which labour can be transformed from activity i into the (composite) activity j[1/]:

$$\ell^*_i = \ell^* + \beta_i \ (w_i - w_j) \qquad (6)$$

The proportional change in the total labour supply has been given in equation (4) as a function of the proportional changes in the average wage rate from all activities, w and in the non-labour income or assets, a, along with the corresponding labour supply elasticities, ε_w and ε_a. Substituting equation (4) into equation (6) we obtain the (proportional change in the) labour supply to each activity, ℓ^*_i, as a function of the observable variables, w, a_1 and w_i and w_j :

$$\ell^*_i = \varepsilon_w w + \varepsilon_a a + \beta_i \ (w_i - w_j) \qquad (7)[2/]$$

When i represents the fishing industry, the income differential, $w_i - w_j$, may be considered as measure of the amount of resource rent (or loss) from fishing accruing to the household. In theory, if this differential is positive ($w_i < w_j$), other things constant, there will be entry into the fishery, i.e., the amount of labour (and capital) allocated to fishing will increase, both by existing fishing households and new entrants; if this differential is negative ($w_i > w_j$) there will be exit from the fishery. The estimate of the coefficient, β_i, is basically an estimate of the elasticity of labour supply to activity i with respect to the rent or wage differential in the sense that it measures the proportional change in labour supply, ℓ_i, due to a proportional change in the wage differential.

With the addition of an error term to account for random factors and errors of measurement and appropriate data on w, a, w_i and w_j, the parameters ε_w, ε_a and β_i of equation can be estimated through least-square regression techniques. Less rigorously, we may use the framework of equation (6) to study occupational mobility among fishermen by relating changes in fishing and non-fishing labour supply to changes in wage rates and assets, as follows. Based on equation (6):

$$\ell_F = \ell + \beta_F \ (w_F - w_{NF}) \qquad (8)$$

and

$$\ell_{NF} = \ell + \beta_{NF} \ (w_{NF} - w_F) \qquad (9)$$

where ℓ : proportional change in total labour supply by the household between 1978 and 1983.

ℓ_F, ℓ_{NF} : proportional changes in household labour supply to fishing and non-fishing activities respectively.

1/ W_j is the average of the wage rates of all occupations other than i. When a large number of occupations is considered by the household, w_j is the average wage of all activities including i.

2/ When $w_j \simeq w$ equation (7) may be rewritten as: $\ell_i = (\varepsilon_w - \beta_i)w + \varepsilon_a a + \beta_i w_i$

w_F, w_{NF} : proportional changes in fishing and non-fishing wages, respectively.

β_F, β_{NF} : mobility coefficients for fishing and non-fishing occupations, respectively.

Equations (8) and (9) state that the proportional change in labour supply to each activity will equal the proportional change of total labour supply unless the wage rates of the two activities have changed at different rates. The labour supply to the activity whose wage rate has increased faster than other activities will grow faster (and the other activities slower) than the overall labour:

$$\ell_F - \ell = \beta(w_F - w_{NF}) \qquad (10)$$

$$\ell_{NF} - \ell = \beta(w_{NF} - w_F) \qquad (11)$$

The relationship between the proportional changes of labour supply to fishing and non-fishing activities in response to their wage differential is obtained by solving (8) and (9) simultaneously to obtain:

$$\ell_F - \ell_{NF} = \beta_F(w_F - w_{NF}) - \beta_{NF}(w_{NF} - w_F) \qquad (12)$$

$$= (\beta_F + \beta_{NF})(w_F - w_{NF})$$

which states that the proportional changes in labour supply to fishing and non-fishing activities would differ in <u>proportion</u> to the difference in the proportional changes of their wage rates. This proportion is the sum of the mobility coefficients for the two sectors.

Ideally, the mobility coefficients β_F and β_{NF} are estimated statistically by fitting equation (7) to data on proportional changes in labour supply and wages for fishing and non-fishing activities and other related variables such as assets and prices (see next section). In the text we use a more crude approach to obtain a rough estimate of the mobility coefficients which, however, do not differ much from the econometric estimates reported in the next section. Equations (10), (11) and (12) are solved for β_F and β_{NF}:

$$\beta_F = (\ell_F - \ell) / (w_F - w_{NF}) \qquad (13)$$

$$\beta_{NF} = (\ell_{NF} - \ell) / (w_F - w_{NF}) \qquad (14)$$

$$\beta_F + \beta_{NF} = (\ell_F - \ell_{NF}) / (w_F - w_{NF}) \qquad (15)$$

We may then calculate the average ℓ_F, ℓ, ℓ_{NF}, w_F, and w_{NF} for a large number of households and use it to compute β_F and β_{NF}.[1/]

<u>Econometric estimates</u>

Using a 40-household sub-sample of the 1983 survey, Panayotou, D. (1985) estimated a fisheries labour supply function of the form given in equation (7), through ordinary-least-squares regression analysis. She obtained the following results:

$$\ell_F = -7.98 + 0.55w - 0.08a + 0.38\,(w_F - w) \qquad (16)$$

$$(-1.64)\quad (4.60)\quad (-3.07)\quad (1.49)$$

$$R^2 = 0.63 \quad \bar{R}^2 = 0.60 \quad df = 36$$

1/ The effect of assets and prices is already included in ℓ since $\ell = \varepsilon_w w + \varepsilon_a a$ where both wages and assets are expressed in real terms. However, it is necessary to adjust for changes in the number of working members in the household.

where ℓ_F is the proportional change in labour supply to fishing, w is the proportional change in the average real wage rate or the opportunity cost of leisure, a is the proportional change in real non-labour income, $(w_F - w)$ is the differential in the proportional changes of the fishing and total real wage rates, $\bar{R}^2$ is the coefficient of determination adjusted for degrees of freedom (df) and the figures in parentheses are t-ratios.

As seen from equation (16), all important economic variables are statistically significant at the 0.1 level and bare the expected sign. Their coefficients, which are elasticities expressing the percentage change in ℓ_F due to a one percent change of the corresponding variable, are of reasonable magnitudes. Thus, the elasticity of the fishing labour supply with respect to the total wage is 0.55, that is a 10 percent change in the wage rate would bring about a 5.5 percent change in the fishing labour supply. However, an equal change in non-labour income would change fishing labour supply by less than one percent. Finally, a 10 percent change in the wage differential would result in a 3.8 percent change in labour supply to fishing. Thus, the econometric estimate of the mobility coefficient is of the same order of magnitude and quite close to the rough estimate we obtained using average figures from a larger sample (see Table 26 in text).

Since the theoretically important economic variables of equation (16) have explained only 60 percent of the total variation in fishing labour supply ($\bar{R}^2 = 0.60$) it is appropriate to investigate whether non-economic variables may help explain any part of the remaining variability. Thus, we tested the hypotheses that the household's sex and age structure, the marital status of its members, the family size, the number of working members, the level of education, and the location and degree of isolation of the fishing community have a significant effect on labour supply to fishing. Most of these hypotheses were rejected. Only median age, m, family size, f, and isolation, D, were found to be statistically significant. A fourth statistically significant variable was "entry", E, a dummy variable taking the value of 1 for households which had increased their labour supply to fishing (at a faster rate than the work force) and the value of zero for households whose labour supply to fishing declined. The purpose of the inclusion of this dummy variable was to test the hypothesis that entry into fishing is easier than exit. When the insignificant variables were dropped, the following results were obtained:

$$\begin{aligned} \ell_F = &- 11.01 + 0.50w - 0.05a + 0.47(w_F - w) \\ &(-1.87) \quad (4.76) \quad (-2.16) \quad (2.08) \\ &- 0.13m + 0.52f + 7.95\,D + 23.09\,E \qquad (17) \\ &(-1.57) \quad (3.02) \quad (1.35) \quad (2.69) \\ &R^2 = 0.76 \quad \bar{R}^2 = 0.71 \quad F = 14.8 \quad DF = 32 \end{aligned}$$

Again, all coefficients have the expected sign and a reasonable magnitude. The elasticities of the main economic variables have changed very little from what they were in equation (16), except for the mobility coefficient (i.e., the elasticity with respect to the wage differential) which rose 0.38 to 0.47 which is very close to the rough estimate of 0.50 - 0.56 obtained in Table 26. The coefficient on the proportional change in median age of the working members is negative, -0.13, suggesting that a 10 percent increase in median age would reduce the labour supply to fishing by 1.3 percent. This is to be expected since fishing is a strenuous activity which requires physical strength. On the other hand, a 10 percent increase in family size, other things constant, would increase the labour supply to fishing by 5.2 percent. This is again consistent with a priori expectations since both economies of scale and time endowment constraints on the part of working members would result in less than proportional increase in labour supply. Households in isolated communities supply eight percent more labour to fishing than households in less isolated communities, presumably because of the lack of alternative employment opportunities. Finally, the entry variable was both statistically significant and positive suggesting that a minority of households (25) would have increased their labour supply to fishing by 12 percent with unchanged socio-economic variables, while the remaining 75 percent would have reduced it by 11 percent which implies that, on the average, exit might be easier than entry. For further details on this and additional econometric results see Panayotou, D. (1985). Caution, however, must be exercised in comparing the results of the two studies because of difference in sample size, scope and methodology.

APPENDIX B : QUESTIONNAIRE

"LABOUR MOBILITY IN THE THAI FISHERIES"

Family Name .....

Representative of family head .....

House No..... Village .....Tabol.....

Ampore ..... Province .....

Interviewer .....

Date .....

1. PERSONAL AND OCCUPATIONAL INFORMATION OF HOUSEHOLD

1.1 Head and Other Members of Household

No.	Name	Sex	Age	Religion	Relation to Head	Marital Status	Residence	Education	Main Occupation		

* Specify occupation of household member as below:

1.2 Fishing Employment, Fishing Ground, Income and Household

1.2.1 For Fishing Operator (Both Mobile and Stationary Gear) 1983

No.	Name	Fishing Ground					Time Spent Fishing					Income		Type of Fishing Gear
		Name of Place	Distance from Shore		Distance from Home		Hrs/Day	Day/ Month	Month/ Year	Hours/ Trip	Trip/ Month	Gross Income	Net Income	
			Km.	Hrs.	Km.	Hrs								

1.2 Fishing Employment, Fishing Ground, Income and Household

1.2.2 For Fishing Operator (Both Mobile and Stationary Gear) 1978

No.	Name	Fishing Ground					Time Spent Fishing					Income		Type of Fishing Gear
		Name of Place	Distance from Shore		Distance from Home		Hrs/Day	Day/ Month	Month/ Year	Hours/ Trip	Trip/ Month	Gross Income	Net Income	
			Km.	Hrs.	Km.	Hrs.								

1.2.3 For Fishing Laborer (On Boat, With Stationary Gear or as Fish Processor) 1978

No.	Name	Fishing Ground						Fishing Time					Income		Type of Occupation
		Name of Place	Distance from Shore		Distance from Home		Cost per Trip	Hrs/ Day	Day/ Month	Month/ Year	Hrs/ Trip	Trip/ Month	Gross Income	Net Income	
			Km.	Hrs.	Km.	Hrs.									

1.2.4 For Fishing Laborer (On Boat, With Stationary Gear or as Fish Processor) 1983

No.	Name	Fishing Ground					Cost per Trip	Fishing Time					Income		Type of Occupation
		Name of Place	Distance from Shore		Distance from Home			Hrs/ Day	Day/ Month	Month/ Year	Hrs/ Trip	Trip/ Month	Gross Income	Net Income	
			Km.	Hrs	Km.	Hrs									

1.3 For Non-Fishing Occupation (1983)

No.	Name	Occupation		Occupation Place			Cost per Trip	How Do You Go?	Time			Income (Monthly)	
		Type	Experience (Year)	Name of Place	Distance from Home				Hrs/ Day	Day/ Month	Month/ Year	Gross Income	Net Income
					Kms.	Hrs.							

1.4 For Non Fishing Occupation (1978)

No.	Name	Occupation		Occupation Place			Cost per Trip	How Do You Go?	Time			Income (Monthly)	
		Type	Experience (Year)	Name of Place	Distance from Home				Hrs/ Day	Day/ Month	Month/ Year	Gross Income	Net Income
					Kms.	Hrs.							

1.5 Income of Household by Occupation

Type of Occupation	Cash		Non-Cash Per Month (Value)
	Gross Income Per Month	Net Income Per Month	
1. Own fishing			
2. Labourer			
2.1 On boat			
2.2 Fish processing			
3. Farming			
3.1			
3.2			
3.3			
4. Plantation			
4.1			
4.2			
4.3			
5. Fish culture			
6. Livestock			
7. Salt Farming			
8. Detailer			
9. Mining			
10. Business			
11. Bus-driver			
12. Truck-driver			
13. Government Official			
14. Clerk			
15. Labourer			
16. Local official			
17. Others			
.....			

Other income, e.g. pension

2. ASSETS

2.1 Fishing assets

Type	Present value	Economic life
(1) Boat 1.		
2.		
(2) Engine 1.		
2.		
3.		
(3) Trawler 1.		
2.		
(4) Purseine 1.		
2.		
(5) Gillnet 1.		
2.		
(6) Push net 1.		
2.		
(7) Net 1.		
2.		
3.		
(8) Hook		
(9) Navigation equipment		
(10) Rope		
(11) Floats		
(12) Sinkers		
(13) Ice container		
(14) Fish container		
(15) Trap 1.		
2.		
(16) Bamboo stoke trap 1.		
2.		
(17) Pong pang		
(18) Ron Siman		
(19) Shellfish gathering		
(20) Others		
.....		

2.2 Non-fishing assets

Items	Number (Rai)		Distance from home	Present value	Economic life	Renting out	Income from renting out per month
	Rent	Own					
2.2.1 Land							
(1) Land for housing							
(2) Paddy land							
(3) Land for crop							
1.							
2.							
3.							
(4) Well							
(5) Others							
.....							
.....							
2.2.2 Farm machinery and transportation							
(1) Tractor							
(2) Water pump							
(3) Harvest machine							
(4) Trucks							
(5) Motorcycle							
(6) Automobile(car)							
(7) Bicycle							
(8) Other							
2.2.3 Warehouse and processing equipment							
(1) Boathouse							
(2) Cold storage							
(3) Other storage							
(4) Processing equipment							
1.							
2.							
3.							
(5) Small shop							
2.2.4 Livestock and poultry							
(1) Buffalo							
(2) Cattle							
(3) Pig							
(4) Duck							
(5) Chicken							
(6) Others							

3. HOUSEHOLD EXPENDITURE AND SAVING

3.1 Household expenditure

No.	Items	Annual Pay	Monthly Pay	Daily Pay	Produced at Home
1	Rice				
2	Meat				
3	Fish				
4	Dairy produce				
5	Vegetable & fruit				
6	Other food				
7	Drink & cigarettes				
8	Charcoal & cooking fuel				
9	Fuel for car or motorcycle (not use for fishing)				
10	Clothes				
11	Travelling				
12	Medical care				
13	Utilities				
14	Education				
15	House repairing (maintenance)				
16	Donations				
17	Taxes and fees				
18	Others				

3.2 Annual investment

3.2.1 In fishing ..... Baht

3.2.2 In non-fishing ..... Baht

3.3 Saving

3.3.1 Deposit ..... Baht

3.3.2 Rate of return ..... Baht

4. FISHING OCCUPATION

4.1 Income

No.	Species	Quantity Per Trip (kg)	Household Consumption			Processed Form			Sold to Market		
			Quantity	Price	Value	Quantity	Price	Value	Quantity	Price	Value
1											
2											
3											
4											
5											
6											
7											
8											
9											

4.2 Cost of Fishing

No.		Items	Baht/Month	Baht/Trip
1	Remuneration to Crew	Fix wages and salary		
2		Share of value of catch		
3		Pay in kind		
4		Food		
5		Family labour		
6		Other		
7	Operation Cost	Fuel		
8		Oil and grease		
9		Ice		
10		Water		
11		Fish container		
12		Gas		
13		Other operating cost		
14	Maintenance	Maintenance and repair of boat		
15		M & R of engine		
16		M & R of fishing gear		
17		Renewal of bait and gear		
18		Other		
19	Charge and fee	Landing fee		
20		Sale fee or charge		
21		Administration Cost		
22		Other		

4.3 Cost of Non Fishing Occupation

(Baht)

Items	Type of Occupation			
	1.....	2.....	3.....	4.....
Seed and variety				
Fertilizer				
Insectiside				
Land preparation				
Repair and maintenance of equipment				
Labour cost				
Family labour cost				
Fuel				
Food				
Other expense				
Plantation and harvest season				

5. MIGRATION AND CHANGE IN OCCUPATION DURING THE PAST 5 YEARS (1978-1983)

5.1 Migration (in and out)

No.	Name	Number of Years Staying in this Village	Place of Previous Residence and Employment				Reason for Migration	Do you want to out-migrate?	Why?
			Res.	Employm.	Occ.	Income per Month			

5.2 Experience in Occupation and Outlook of Occupation

No.	1 Name	2 Experience: Main Occupation	3 Experience: Fishing if Not Main	4 Experience: Minor if Not Fishing	5 Other Training	6 Previous Main Occupation	7 Ever Before Attempted to Change Occupation?		8 Are You Willing to change?		9 If Yes What Job?	10 If Not Why?	11 If Not Fishing Now Do You Plan to Take It Up in the Future
							Yes	No	Yes	No			

Remarks: 1) In column 8 ask only the head of household, his wife or person we are sure can answer correctly

2) In column 11 ask only persons who were not fishing before

5.3 Job Opportunities

5.3.1 How far did you go away from the village last year?

5.3.2 How often? .....

Where to? .....

5.3.3 Purpose? .....

5.3.4 What kind of job do you think you can do in addition to fishing?

Where? .....

Income..... ( ) greater than fishing

( ) not greater than

Reason for not changing to that job if the income is greater than fishing.

.....

5.3.5 Do you know what the wage rate in town is?

( ) Yes. How much?.....Baht/person/day

( ) No.

5.3.6 Do you know about fish culture?

( ) Yes.

( ) No.

If yes, what kind of fish culture?.....

5.3.7 Would you like to switch from fishing to fish culture?

( ) If yes, why? .....

( ) If not, why? .....

6. SOCIAL DATA

6.1 Housing and Land

6.1.1 Is the house you are presently living in

( ) your own house

( ) your parent's house

( ) your relation's house

( ) rented house

6.1.2 Landownership

( ) complete ownership

( )

( )

6.1.3 Is your crop land

( ) free public land ..... rai

( ) free father land ..... rai

( ) free relation land ..... rai

( ) rented land ..... rai

( ) your own land ..... rai

( ) other ..... rai

6.1.4 Landownership

( ) complete ownership

( )

( )

6.2 Local Public Utilities

6.2.1 Public service utilization

No. Type	Satisfactory	Unsatisfactory	Do not know	Not existant	Any comments
1. Electricity					
2. School					
3. Public health					
4. Security					
5. Water supply					
6. Communication					
7. Community leadership					
8. Availability of shops					
9. Transportation					

6.2.2 What is the main source of drinking water in the household?

( ) own-keeping
( ) public, village keeping
( ) own well
( ) public well
( ) canal & river
( ) rain
( ) other

6.2.3 Source of light in the household

( ) electricity
( ) oil lamp
( ) other

6.3 Communication and Source of Information

6.3.1 How frequently do you read newspaper?

( ) every day
( ) once a week
( ) more than once a week
( ) seldom

6.3.2 What is the main source of outside general information?

( ) newspaper
( ) radio
( ) government officials
( ) other
( ) magazine
( ) T.V.
( ) neighbour

6.3.3 What sort of information do you usually read?

( ) political
( ) educational
( ) Bangkok's news
( ) social activities
( ) rural and agricultural development
( ) other

6.4 Future Outlook for Occupation

6.4.1 In future do you think your occupation in fishing will be

( ) better ( ) worse ( ) no change

6.4.2 Do you think your children should take up fishing as their occupation?

( ) yes ( ) no.

6.5 Problems and Areas Where Help is Needed

6.5.1 Fisheries occupation

6.5.1.1 .....

6.5.1.2 .....

6.5.1.3 .....

6.5.1.4 .....

6.5.2 Non-fisheries

6.5.2.1 .....

6.5.2.2 .....

6.5.2.3 .....

6.5.2.4 .....

6.6 Suggestions to Improve Occupational and Sociological Conditions.

6.6.1 .....

6.6.2 .....

6.6.3 .....

6.6.4 .....

PAPERS ON PRACTICES OF FISHERIES MANAGEMENT

Burke, W.T., 1982 Fisheries regulations under extended jurisdiction and international law. FAO Fish.Tech.Pap., (223): 23 p. Issued also in French and Spanish

Troadec, J.-P., 1983 Introduction to fisheries management: advantages, difficulties and mechanisms. FAO Fish.Tech.Pap., (224):57 p. Issued also in French and Spanish

Christy, F.T.Jr., 1982 Territorial use rights in marine fisheries; definition and conditions. FAO Fish.Tech.Pap., (227):10 p. Issued also in French and Spanish

Panayotou, T., 1982 Management concepts for small-scale fisheries: economic and social aspects. FAO Fish.Tech.Pap., (228):53 p. Issued also in French and Spanish

MacKenzie, W.C., 1983 An introduction to the economics of fisheries management. FAO Fish.Tech. Pap., (226): 31 p.

Asada, Y., Y. Hirasawa and F. Nagasaki, 1983 Fishery management in Japan. FAO Fish.Tech.Pap., (238):26 p. Issued also in French and Spanish

Beddington, J.R. and R.B. Rettig, 1984 Approaches to the regulation of fishing effort. FAO Fish.Tech.Pap., (243):39 p. Issued also in French and Spanish

Smith, I.R. and T. Panayotou, 1984 Territorial use rights and economic efficiency: the case of the Philippine fishing concessions. FAO Fish.Tech.Pap., (245):17 p. Issued also in French and Spanish

Arzel, P., 1984 Traditional management of seaweeds in the district of Leon. FAO Fish.Tech.Pap., (249):49 p. Issued also in French

Scudder, T. and T. Conelly, 1985 Management systems for riverine fisheries. FAO Fish.Tech.Pap., (263):85 p. Issued also in French and Spanish

Vendeville, P., 1986 Tropical shrimp fisheries. Types of fishing gears used and their selectivity. FAO Fish.Tech.Pap., (261):70 p. Issued also in French; Spanish version in preparation

Panayotou, T. and D. Panayotou, 1986 Occupational and geographical mobility in and out of Thai fisheries. FAO Fish.Tech.Pap., (271):77 p.

M-43
ISBN 92-5-102347-6